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Credit Constraints and Investment Behavior in Mexico's Rural Economy

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Abstract

This paper uses two recently completed surveys of individual entrepreneurs (farmers and microentrepreneurs) and registered enterprises (agricultural and nonagricultural) operating in Mexico's rural sector to provide new evidence about the factors influencing the incidence of credit constraints and investment behavior. To measure the incidence of credit constraints, the authors use self-reported information on whether economic agents have a demand for loans, separating formal and informal markets. They define credit constraints as a situation where rural agents report an unsatisfied demand for loans (formal or informal), which originates from rural agents having projects that are too risky or from impediments hindering the ability of rural agents and lenders to reduce information asymmetries. The authors find that the self-reported demand for loans is low. Nevertheless, the incidence of credit constraints is pervasive, especially among individual entrepreneurs. The low use of loans has consequences for the amount of investments that occur in the rural economy, posing a major obstacle to Mexico's convergence towards its NAFTA partners. The empirical analysis, which includes proxies of business prospects and creditworthiness, shows that improving the availability of loans to credit constrained agents would increase the number of agents making investments and their investment to capital ratios.

This paper—a product of the Finance and Private Sector Team, Development Research Group—is part of a larger effort in the department to evaluate access to credit. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at ilove@worldbank.org@worldbank.org.

Credit Constraints and Investment Behavior in Mexico's Rural Economy

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1. Introduction

Are rural economic agents credit constrained? This question is of interest not only to researchers but also to public officials whose policies influence the availability of funds in rural loan markets. Without access to external finance, entrepreneurs and enterprises cannot realize their full growth potential, resulting in slower economic growth for a country as a whole. Inability to obtain sufficient funds, or, in other words, credit constraints, is often cited as one of the main factors limiting firms' operations and growth, especially so in countries with weak financial markets and institutions. In the case of Mexico, Chapter 2 shows that individual entrepreneurs and enterprises mention lack of credit as a constraint to their operations. The data from the World Business Environment Survey (WBES) illustrate the issue of access to financial services from the enterprise' perspective.[1] Such data show that Mexican firms rate financing as more of an operational and growth constraint than for their counterparts in other Latin American countries. Moreover, they rate access to long-term loans, access to export finance, paperwork, and corruption of bank officials as greater obstacles than for enterprises in the Latin American region.[2]

In the economic literature credit constraints (or credit rationing) are defined as a situation in which interest rates do not fully adjust to equalize the demand and supply of loans. Some borrowers are denied credit even though they are willing to pay market interest rates (or more), whereas apparently similar borrowers are able to obtain credit (Jaffee and Stiglitz, 1981). The borrowers who are denied credit (either fully or partially) are referred to as credit constrained. Thus, credit constraints arise as a response to asymmetric information problems that characterize loan contracts. On one side, the willingness of the borrower to accept higher interest rate signals their higher risk (and therefore higher probability of default), which leads to lender's unwillingness to lend to these customers because of the perceived adverse selection effect. On the other side, obtaining a higher interest loan may decrease repayment incentives of the borrower and may induce them to take up riskier projects (the moral hazard effect). Both of these situations result in a case of credit constraint (that is, when interest rates do not adjust and there is an excess demand for loans). To solve the asymmetric information problem, lenders resort to different mechanisms to screen, monitor, and enforce credit contracts, such as collateral requirements, gathering of information, or monitoring activities. Less developed countries with poor financial sector infrastructure (such as poor credit information registries, poor collateral laws, and so forth) may see a stronger incidence of credit constraints.

Do credit constraints affect investment behavior? The linkage between investment behavior and credit constraints receives substantial attention among researchers and policymakers. By having a negative effect on the investment behavior of economic agents, credit constraints can influence firms' growth potential, especially among small firms.[3] At the firm level, Demirguc-Kunt and Maksimovic (1998) calculated the proportion of firms growing faster than if using only internally generated funds. They find

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[1] Please note that the WBES is the first effort to collect consistent cross-country survey data from a representative sample of firms in the manufacturing, service, and other sectors. However, this survey is very restricted in the number of firms for each country, and thus its findings should be interpreted as anecdotic evidence.

[2] See the WBES interactive dataset for individual questions for Mexico and other countries at http://info.worldbank.org/governance/wbes/index1.html.

[3] Extensive literature exists on the linkage between aggregate investment and economic growth at the macro level. This discussion is omitted here because our main interest is at firm or household level. See for example Levine (1997), Rajan and Zingales (1998), and Beck and others (2000).

that this proportion is positively related to financial development and to legal system indicators, suggesting that access to finance at the firm level increases their growth. More recently, Beck and others (2002) used WBES survey data to study the effect of financing constraints on growth using subjective evaluations of entrepreneurs of the financing and legal constraints they face. They find that firms reporting higher financial and legal constraints and corruption grow more slowly, and this effect is especially strong for small firms.

Mexico is an important case to study the issues mentioned above. It not only lags behind comparable countries in terms of domestic financial development, but also presents a sustained contraction of domestic financial depth as measured by credit- and liabilities-side indicators of financial depth. Bank deposits to GDP in the country declined from 25 percent in 1997 to 17 percent in 2002. Similarly, over this period, M2 to GDP fell from 28 percent to 22 percent. Overall, credit to the private sector, including lending by private and development banks, nonbanks, and foreign sources, declined from 43 percent to 40 percent, attributed to a contraction of bank lending.[4] Private bank lending to the private sector fell from a peak equivalent of 16 percent of GDP to 9 percent.[5] Development banks also decreased their lending from 3.4 percent of GDP to 2.2 percent. Until the Tequila crisis in 1995, banks had been the main source of credit to the private sector in Mexico. Since then, nonbank and foreign financing have kept pace with GDP growth, providing an alternative source of financing in addition to retained earnings. As in other countries, there is a trend for financial intermediation to move away from bank deposits and credit to nonbanking instruments and institutions. Enterprises and people tend to increasingly finance themselves from nonbank entities, such as investment companies (SOFOLES), savings and loan societies, credit unions, leasing companies, factoring companies, nonbank liabilities of listed Mexican companies, debt issues of unlisted companies, and credit-card financing provided by retail businesses. In recent years, nonbank institutions and foreign sources (liabilities contracted abroad) have become important providers of credit to the private sector (17 percent and 12 percent of GDP in 2002, respectively).

At the micro level, there are concerns that economic agents such as enterprises and individual entrepreneurs face increasing levels of credit constraints, hampering their ability to make investments. Available survey data indicate that both enterprises and entrepreneurs participate in loan markets to a limited extent, especially in formal markets. For example, a survey of rural entrepreneurs in three Mexican states finds that 24 percent participated in loan markets, of which 7 percent borrowed from formal lenders in 1993-1994 (World Bank 1995). A recent survey of small- and medium-size enterprises in Mexico City finds that only 30 percent used bank loans in the past 12 months (World Bank 2002). The Bank of Mexico, which carries out a quarterly survey of 600 firms about their financing sources, reports that about 20 percent of enterprises surveyed use bank loans.

Previous empirical evidence on the incidence of credit constraints in Mexico indicates its pervasiveness. Using a survey of farmers in the states of Sonora, Guanajuato, Puebla, and Tlaxcala, Stanton (1994) studies the access to credit by farmers in rural Mexico, estimating a disequilibrium model of supply and demand for loans (without distinguishing formal and informal sectors). The author finds that supply is significantly increased by the presence of collateral and the number of loans received in the past (likely evidence of good credit history), whereas demand is influenced by the usage of machinery in farming. The model predicts that over 80 percent of farmers receive the amount of credit that is determined by the supply function, and thus are credit constrained. Furthermore, educational attainment, size of land holdings owned, and usage of credit for land improvement have a positive effect, whereas nonfarm

[4] For private and development banks only direct financing is included.

[5] Nevertheless, credit conditions appear to be improving in 2003: credit to the private sector grew at positive rates every month in 2003 with year-on-year growth rates of at least 9 percent.

employment by household members and perceived problems in obtaining credit have a negative effect on both the incidence and the amount of credit. In another study that examines credit constraints in rural Mexico, Key (1997) estimates a structural model that jointly determines production, consumption, and borrowing decisions of households. The author finds that about 32 percent of all formal borrowers are credit constrained (that is, they wished to borrow more than they were able to). The empirical model estimated that the high transaction costs of borrowing from formal lenders prevents small-scale farmers from accessing formal lenders, indicating that a reduction of those transaction costs may induce some small borrowers to switch from informal to formal sources of credit.

As to manufacturing firms, the available evidence shows that credit constraints affect their investment patterns. *First*, for the period 1984-94, Gelos and Werner (1999) use the accelerator model of investment and the Euler equations, both augmented with cash flows indicator, to estimate the effect of financial liberalization on financing constraints of a set of 1,046 manufacturing firms. They find a strong link between cash flows and investment for most types of firms with smaller firms being more constrained. However, financial constraints were eased for small and exporting firms but not for large firms after financial liberalization. *Second*, Iscan (1998) estimates a version of the Euler equation to evaluate the impact of the debt crisis of 1982 on manufacturing sector investment. He finds very high discount rates if the 1982-1984 period is included in the sample and lower estimates (close to world interest rate plus spread) when this period is excluded. This suggests that this period of crisis was characterized by binding financing constraints. *Third*, Sánchez (2001) estimates an accelerator model of investment supplemented with a cash flows indicator using a 3-digit industry level data on manufacturing establishments for 1984-99. He finds that cash flows have a significant effect on investment rates. Furthermore, capital expenditures of small firms are twice as sensitive to changes in cash flows than for large firms, suggesting that financing constraints are more severe for small firms. Lastly, the author finds increasing sensitivity to cash flows for small firms over time, and indication of worsening levels of credit constraints. *Fourth*, using balance sheet data for 176 listed firms for 1990-2000, Castaneda (2002) finds that both firms associated to economic groups and independent firms display less sensitivity of investments to cash flows following the 1995 crisis, which is a somewhat puzzling result for independent firms. A possible explanation is that firms with access to capital markets provide supplier credit to independent firms, recycling funds to the economy. An actively functioning internal capital markets that channel funds between members of an economic group would result in lowering credit constraints for members of an economic group. Another interesting finding is that firms that had relationships with banks experienced greater financing constraints, as a result of persistent weaknesses in the banking sector in this time period. *Lastly*, Cuevas and others (2002) present evidence of an amplification of liquidity constraints after the banking crisis for firms listed in the stock exchange as well as for manufacturing firms for the period 1990-1999.

This paper seeks to provide new evidence about the extent of credit constraints and their effect on investment using two recently completed surveys that distinguish four categories of economic agents: farmers and microentrepreneurs (also referred to as entrepreneurs or individuals) from a household survey; and agricultural and nonagricultural enterprises, from an enterprise survey. This paper does not intend to provide a definite answer about the roots and consequences of credit constraints, but rather tries to elaborate on the possible explanations of the limited use of formal or informal loans among entrepreneurs and enterprises in Mexico. Lastly, this paper attempts to estimate the effect of removing credit constraints on investment behavior.

This paper defines credit constraints as a situation where rural agents report an unsatisfied demand for loans (formal or informal), which originates from rural agents having projects that are too risky or from

impediments hindering the ability of rural agents and lenders to reduce information asymmetries.[6] This unmet demand for loans can also be explained by "true credit rationing," which arises when creditors do not raise interest rates (in order to avoid an adverse selection problem) to clear the market and, instead, reject some loan requests from debtors that are willing to pay higher interest rates, and thus are perceived to be too risky.

This paper is organized as follows: Section 2 describes the data and Section 3 presents an overview of loan providers in Mexico. Section 4 discusses the methodology in this paper to measure the extent of credit constraints. Section 5 presents indicators of participation in loan markets, measuring the extent of credit constraints and the self-reported demand for loans in both formal and informal markets. Section 6 empirically analyzes the demand and supply of formal and informal loans. Section 7 studies investment behavior and assesses the effect of credit constraints. Section 8 summarizes the main findings.

2. Data sources

This paper relies on two recently conducted surveys of households and enterprises in Mexico. Both surveys are representative at the national and regional level. The household survey covers farmers and microentrepreneurs—that is the so-called individual entrepreneurs (self-employed and employers) residing in localities with 2,500 to 50,000 inhabitants. It also covers those farmers living in localities with more than 50,000 residents. To identify entrepreneurs, the sample was drawn from the National Employment Survey for the quarter of October-December 2001. The enterprise survey includes agricultural and nonagricultural registered enterprises in localities with 2,500 to 50,000 inhabitants. In localities with more than 50,000 residents, the enterprise survey considers only enterprises in the agrobusiness and fishing sector (agricultural). In localities with less than 2,500 residents, the enterprise survey considers only large enterprises (with more than 100 workers). The sample was drawn from Mexico's 1999 Economic Census. The enterprises can be legally established as either personas morales, or as personas físicas con actividad empresarial. To avoid an overlap with the household survey, the enterprise survey considers only enterprises with six workers or more.[7]

Table 1 summarizes survey results by geographical region and type of economic agent. The final sample of completed questionnaires contains responses for 1,825 farmers, 3,301 microentreprenurs, 1,073 nonagricultural enterprises, and 954 agricultural enterprises.

The household and enterprise surveys offer a unique collection of rarely available data about rural economic agents and their use of financial services. The questionnaire design of both surveys include questions about participation in financial markets, formal or informal, and the characteristics of the credit and savings products used by entrepreneurs and enterprises. The household survey questionnaire includes questions about expenses and income, fixed assets, inventories, employment, purchases and sale of fixed assets, marketing of products, suppliers, formality and social capital indicators, training received,

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[6] Loan markets are characterized for information asymmetries. Potential borrowers have better and more information about the true credit risk of investment projects than lenders. In those circumstances, lenders rely on different mechanisms to screen potential borrowers while potential borrowers use different mechanisms to signal their creditworthiness to lenders.

[7] The sampling design divides the Mexican territory into five regions according to Mexico's National Development Plan. Region 1 (South & Southeast) includes the states of Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, and Yucatán. The following states plus Mexico City are included in region 2 (Center): Hidalgo, México, Morelos, Puebla, and Tlaxcala. Region 3 (Center-west) includes the states of Aguascalientes, Colima, Guanajuato, Jalisco, Michoacán, Nayarit, Querétaro, San Luis Potosí, and Zacatecas. Region 4 (Northwest) includes the states of Baja California, Baja California Sur, Sinaloa, and Sonora. Region 5 (Northeast) includes the states of Coahuila, Chihuahua, Durango, Nuevo León, and Tamaulipas.

problems affecting the activity, and future plans. In addition, it contains questions about household characteristics (availability of services, other sources of income, wealth indicators, and dwelling features), land markets (farmers only), and incidence of adverse events (systemic and idiosyncratic). As for the enterprise survey, the questionnaire incorporates questions about formality and social capital indicators, exporting activities, employment, manager characteristics, purchases and sale of fixed assets, marketing, suppliers, training received, problems affecting the enterprise, future plans, and simplified financial statements. By combining household, business, and personal characteristics in a single survey, the data allows for a unique opportunity to examine the determinants of the demand and supply of credit, controlling for all those factors.

3. Classification of formal and informal lenders

In the analysis that follows we differentiate between formal and informal lenders. Informal financial markets are prevalent in Mexico. For example, the World Bank (1995) finds that informal credit markets account for 87 percent of all credit transactions received by farmers and microentrepreneurs in three rural areas of Mexico. Moreover, formal and informal loans differ in important ways that have significant implications for demand and supply.

Table 2 summarizes the classification of the providers of loans that we adopt for this paper. Formal lenders include private banks, development banks, and regulated and unregulated nonbanks that have been allowed to operate under the auspices of a particular piece of legislation. Informal lenders comprise companies and individual entrepreneurs that offer loans outside the purview of regulations. They comprise moneylenders, input suppliers, traders, and agrobusinesses that provide loans with a profit motive. Furthermore, loans from friends and relatives or from partners are also classified as informal in this paper.

4. Measuring credit constraints

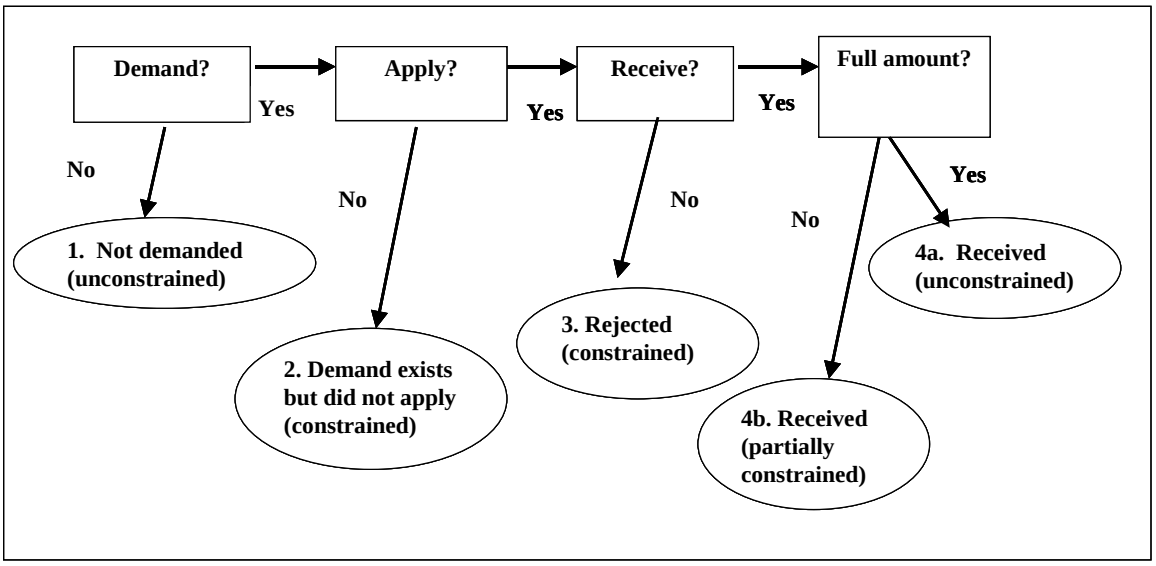
Despite difficulties involved in measuring credit constraints without directly observing them, two main approaches have emerged to identify credit constraints. The first approach, named “indirect method,” attempts to evaluate the extent of credit constraints by estimating disequilibrium models of demand and supply of loans. These models face numerous difficulties in distinguishing supply from demand equations. In addition, empirical estimation of these models relies on complex estimation procedures. The second approach, dubbed “direct method,” relies on survey data with detailed questions about loan applications and the results of such applications. While this avoids the problems associated with disequilibrium models, working with qualitative responses implies another type of challenge. The level of credit constraints (by how much) is not easily measurable. Survey data allows for estimates of the proportion of individual entrepreneurs with a self-reported demand for loans, but not necessarily whether those individual entrepreneurs would be considered creditworthy clients for certain types of lenders. In this regard, the incidence of credit constraints would provide an upper-bound measure of the extent of true credit constraints because not all credit-constrained agents will be considered creditworthy by lenders.

The approach of this paper is to use the latter approach and infer the extent of credit constraints from the survey data. One of the advantages of the household and enterprise surveys collected in the current study is that they allow us to measure potential demand for loans and the extent of credit constraints by

analyzing the proportion of firms/households that demand credit but are unable to obtain it.[8] We are able to identify firms/households that are constrained in the access to loan markets by looking at agents who have either applied for a loan and were denied or who needed the loan but have not applied (potential demand). Using the answers from various questions, we classify all surveyed respondents into 4 main *participation categories* guided by the decision tree showed in Figure 1. The categories are as follows: (1) not demanded, (2) demand but did not apply for a loan, (3) applied for a loan but was rejected, and (4) received a loan.

The *first category* requires identifying respondents that do not demand loans (not demanded). Obviously, those agents who applied for loans in the past three years have a demand for loans. Nonetheless, some agents with a demand for loans may be reluctant to apply because of their perceptions of a complicated loan process with associated high transactions costs, lengthy procedures, or lack of knowledge about how to apply. These agents may find that the cost of applying exceeds the expected benefits of additional funds. Others are discouraged from applying because of a perception that their loan applications would have a high likelihood of rejection due to a lack of adequate collateral or co-signer, or pure discrimination. Another possibility is that agents are discouraged from applying because the loan products offered are ill-suited for their operations or interest rates and fees are too high.

Figure 1: Participation in loan markets



To separate those individual entrepreneurs or enterprises that did not apply for loans into the categories of "demand" and "no demand," we use the self-reported reasons as why they did not apply for a loan. Specifically, we use the following responses as indicators of "no demand": (a) prefers to use his own resources; (b) has access to other sources of financing (implying no demand for this source) and (c) has

[8] When using indirect indicators to assess the incidence of credit constraints, the richness of the survey data determines how to identify credit-constrained agents. For example, Paulson and Townsend (2001) used as an indirect indicator of credit constraint—those households that could increase the size of their business in a profitable way. Guiso (1998) defines credit constrained as those agents that wish a larger amount of credit at the current interest rate or had their loan application rejected. Levenson and Willard (2000) define as credit constrained those that did not obtain all financing needed.

sufficient resources from business operations.[9] All other reasons for not requesting loans are classified as indicating "demand" for loans. Once we separated all those who have no demand, we consider everybody else as having a demand for loans. Therefore the demand category includes people who have demand but did not apply for loans, those who applied and were rejected, and those who applied and received a loan. In other words, the "demand" category encompasses agents in all the remaining categories (2)-(4) indicated in Figure 1.

For the *second category* (demand but not apply) we group all people who have a demand for loan but did not apply for a loan. The *third category* (applied and rejected) contains all people who applied for a loan but were rejected by a lender. Finally, the *fourth category* groups all people who received a loan (we also refer to this category as people with *access* to loans). In addition, we split the category (4) into those who received the full amount requested (4a) and those who received a smaller amount than that requested (4b). We refer to the latter category (4b) as partially constrained.[10]

As shown in Figure 1, categories (2) and (3) are considered to be credit constrained, while categories (1) and (4) are considered as not constrained. As is clear from this classification, the credit-constrained category includes those who had demand but did not apply and those who applied and got rejected, whereas the unconstrained category contains those who do not have a demand for loans and those who have demand and are able to obtain the loans.

Credit-constrained agents include three types of agents that are undistinguishable in the survey data. The first group comprises rural agents who claim they have a demand for loans, but are not considered creditworthy because of the high risk or low return on their prospective investment. This means that the lenders may require high interest rates to compensate for increased risks, and thus those agents would not borrow. The second group encompasses creditworthy clients that could not convey the sufficient signals about their creditworthy and that lenders could not identify because of the underlying lending technology. Lastly, credit-constrained agents also include potential debtors that are willing to pay higher interest rates, but that creditors reject to avoid an adverse selection problem.

5. Participation in loan markets

In the analysis of participation in loan markets, we focus on only three outcomes because of data limitations. The first outcome includes those agents that do not demand loans. The second outcome studied is the so-called credit-constrained group, which includes both those who had demand but did not apply and those who applied and got rejected.[11] The last outcome includes those that have demand and are

[9] Farmers and microenterprises predominantly respond with the first of these three reasons and less than 1 percent of the total population responds with reasons (b) and (c). Among enterprises reasons, (a) is still predominant while about 5 percent of the population also claims reasons (b) and (c).

[10] This is another possible dimension of credit constraints. However, the survey data indicates that only 3-5 percent of those who obtain the loans report that they applied for a larger amount. As a result, the incidence of "partially constrained" is minimal, and it is not studied in this report.

[11] An interesting observation, which is consistent with other surveys in Mexico, is the low percent of rejected loan applications. As shown in Table 3, about 1 percent of the total sample and about 4-6 percent of those who applied had their loan applications rejected with similar proportions for individual entrepreneurs and enterprises. This suggests a self-selection process where those individual entrepreneurs and enterprises that decide to apply expect to get their applications approved. Rejection rates are significantly higher for formal than for informal loan applications. We find an almost perfect self-selection in informal loans markets, partly explained by the nature of relationship between borrowers and lenders. In the case of informal lenders, which include friends and relatives or local moneylenders for individual entrepreneurs and partners and shareholders for enterprises, the concept of "applying" for a loan is not quite applicable, and it is not surprising that we observe a perfect self-selection. As

able to obtain loans. Table 3a presents indicators of these three participation outcomes, differentiating between formal and informal loans. Table 3b presents indicators of the participation outcomes described in Figure 1.

The survey data shows that the low participation rates in loan markets can be partially attributed to limited demand for loans. We find that the proportion of economic agents that do not demand loans is rather extensive, or conversely the demand for loans is limited. As shown in Table 3a and Table 3b, about 53 percent of microentrepreneurs, 57 percent of farmers, 49 percent of nonagricultural enterprises, and 61 percent of agricultural enterprises demand loans. Excluding microentrepreneurs, economic agents report a higher demand for formal loans than for informal ones. Furthermore, those in the agricultural sector (farmers and agricultural enterprises) are more likely to demand loans than their counterparts in the nonagricultural sector.

Nevertheless, the incidence of credit constraints is pervasive across Mexico, especially among individual entrepreneurs. About 37 percent of microentrepreneurs, 41 percent of farmers, 19 percent of nonagricultural enterprises, and 21 percent of agricultural enterprises are credit constrained from both formal and informal lenders. The extent of credit constraints among individual entrepreneurs doubled that of enterprises. This greater incidence among individual entrepreneurs may result from the perception of lenders of more risks or higher transaction costs associated with providing small loans.[12] As shown in Table 3a, for individual entrepreneurs, the incidence of credit constraints is higher from formal lenders than from informal lenders. However, when examining the incidence of credit constraints across all types of lenders, we find that the degree of credit constraints is fairly homogenous across types of lenders with friends and relatives being the only exception. In the case of enterprises, the degree of credit constraints is higher for informal lenders than for formal ones. We observe that the degree of credit constraints for enterprises varies by type of lender. For example, enterprises appear to be the least constrained from private banks but the most constrained from development banks and nonbank intermediaries (See Table 3b).

Credit-constrained agents have an unmet demand for loans because the loan contract offered by formal and informal lenders do not match their needs. As shown in Table 4, credit-constrained individual entrepreneurs are unwilling to request loans mainly because of inadequate amounts and maturities (42 percent) and high transaction costs (35 percent). High interest and fees deter only 1.5 percent of credit-constrained individual entrepreneurs from requesting loans. Enterprises are more concerned with high interest rates (23 percent) and high transaction costs (19 percent) than with inadequate maturities and amounts (9 percent).

Insufficient information about loan application procedures deters many credit-constrained agents from requesting loans: about 27 percent of individual entrepreneurs and 18 percent of enterprises. This suggests that lenders are not marketing their products to rural agents or that lenders are not located close enough to rural agents.

However, many other rural agents consider that they would not be considered creditworthy by lenders. The perception that their loan application will be rejected inhibits about 25 percent of individual entrepreneurs and 22 percent of enterprises from requesting loans. The percentage of credit-constrained

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expected, the percent of rejected applications to private banks for individual entrepreneurs is much larger than that for enterprises. As a percent of loan applicants, we observe 33 percent of rejected applications for both farmers and microentrepreneurs, while only 10 percent and 4 percent of nonagricultural and agricultural registered enterprises had their loan applications rejected.

[12] This indicates that the interest rates required to cover credit risk and transaction costs does not clear the market.

agents that had their loan application rejected is fairly low (2.3 percent of individual entrepreneurs and 7 percent of enterprises), which indicates a self-selection process.

Another fraction of credit-constrained agents considered borrowing too risky (16 percent of individual entrepreneurs and 9 percent of enterprises). The perception that borrowing is too risky, however difficult to interpret, suggests that rural agents that responded in such manner must have considered that expected cost of default is higher than the expected benefits of borrowing: defaulting in their loans would have resulted in expected personal losses for themselves. Borrowers experience a loss when defaulting results in losing the properties pledged as collateral or in acquiring a bad reputation. In addition to the costs associated with defaulting, the expected cost of default is also affected by the probability of defaulting, which is influenced by the underlying production technology. This suggests that to meet the credit needs of credit-constrained agents factors affecting the cost of default and the probability of defaulting must be changed.

Taking advantage of the self-reported demand for loans, we gauge the extent to which Mexico's financial markets reach out to economic agents with a demand for loans. In this section we opt to scale the proportion of participants by the proportion demanding loans. This allows us to assess the level of market penetration by type of lenders: the proportion of those with a self-reported demand received loans. Table 3c reports the financial market penetration for six types of formal or informal lenders. We find that the market penetration of formal and informal lenders in loan markets is in a dire state, especially for individual entrepreneurs, suggesting potential room for expansion.[13] For example, private banks reach about 2 percent of individual entrepreneurs demanding bank loans and 44 percent of nonagricultural enterprises and 46 percent of agricultural ones. Compared to private banks, the outreach of development banks is a little bit higher for farmers (4 percent) but substantially higher for enterprises (11 percent). Unregulated nonbank intermediaries reach about 6-8 percent of individual entrepreneurs with a demand for loans. Consistent with uneven levels of financial development across Mexico's region, lenders' outreach varies across geographical regions. In the Northwest region, all types of lenders seem to reach a higher share of farmers with demand than in other regions. In the Center-west region, they have better outreach of microentrepreneurs and enterprises (agricultural and nonagricultural). The South & Southeast region, which is the poorest region in the country, presents the lowest level of coverage from formal lenders.

6. The demand and supply of loans: empirical analysis

What factors drive the probability of having a demand for loans? What affects the likelihood of receiving loans? In this section we look at the demand and supply of loans to get a sense of whether personal, business, or location characteristics have a differentiated effect. We model the demand and supply of loans as binary variables (0/1), concentrating on the loan market outcomes presented above. The proportion of individual entrepreneurs and enterprises that have rejected loan requests or that are either partially constrained are very small, focusing on only three outcomes: no demand, credit constrained, and received (access).[14] The category of credit constrained includes those agents that have a demand but did

[13] It is difficult to measure the potential for expansion, as individual entrepreneurs and enterprises with a self-reported demand for loans may not necessarily be eligible for loans. Their eligibility would depend on the risk preference and lending technology of each type of lender.

[14] Although we find it interesting to study the determinants of those with demand who apply and who do not apply, the small number of applicants who applied and got rejected makes it impossible to do that. In addition, the identification strategy is very difficult. To estimate a structural model of those with demand who make the decision whether to apply or not, we need to assume that some variables help predict the application decision but do not help predict the demand and the lender's decision to satisfy

not apply and those that had their loan application rejected. We study formal and informal loans market separately because of the small fraction of participants in both markets.

6.1 Empirical methodology

Following the methodology of Bigsten and others (2003), we estimate the "demand equation" and the "access equation" (or alternatively the "supply" equation) jointly. The "access equation" only includes those individual entrepreneurs or enterprises with a demand for loans. This implies that the "demand equation" acts as a "selection equation," controlling for the endogenous self-selection process in determining loan demand, and is estimated in the first stage. In the second stage, the probability of access is estimated only for those with demand. The equations estimated are:

$$(1) \quad Demand_{i,l} = \Pr(0 = no\ demand,\ 1 = demand)_{i,l} = \alpha_1' X_i + \alpha_2' Z_i + \varepsilon_{i,l}$$

$$(2) \quad Access_{i,l} = \Pr(0 = no\ access,\ 1 = access \mid Demand = 1)_{i,l} = \alpha_1' X_i + \varepsilon_{i,l}$$

where ***X*** denotes a vector of variables related to the demand and supply of loans, including household, personal, and business characteristics as well as location-specific indicators of economic conditions.[15] We include a number of variables to capture collateral availability, cash flow indicators, alternative sources of credit (supplier credit), and other variables to control for business heterogeneity. The success of the selection model depends on having variables that affect the demand for loans but do not affect the lender's decision on access. This set of variables, which are not directly observable by the lender, corresponds to ***Z***, referred to as "demand identification" variables.

For individual entrepreneurs, the first group of variables includes sociodemographic variables that may influence the demand and supply of loans. Educational attainment may capture managerial skills, household wealth, and capacity to negotiate with lenders. A low level of education can act as a financial market entry barrier given the complexity of financial transactions (Schrieder, 1996). Ethnicity and gender (microentrepreneurs only) may be an important determinant of a household's social network and access to information. Moreover, indigenous people and women may be the subject of discrimination by some lenders. The number of people in the household may affect the demand for loans because it proxies for the life-cycle stage of the household and thus for its desire to invest or its probability of having an emergency. We include the availability of other sources of household income, such as remittances and PROCAMPO (farmers only).

The second set of variables encompasses characteristics of entrepreneurial activities. It includes indicators of firm size and collateral availability, such as age of activity, value of productive assets, formal or informal savings, and number of workers. Furthermore, it includes indicators of formality (registration with government institutions), social capital (membership with guilds), and training. In the regression for farmers we include indicators of land quality (irrigation) and land tenure (ejido), whether products are

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the application. In the absence of such variables we cannot be sure that we identify the application decision as opposed to the lender's decision to grant the loan.

[15] Economic theory emphasizes that both household and business characteristics are important in determining the demand and supply of credit. The survey data allows for a unique opportunity to control for both groups of variables.

sold outside the municipality or through an informal trader (coyote), and type of production (crops, livestock, and crop/livestock subproducts).

For enterprises we include a set of variables relating the personal characteristics of the manager, such as gender, education, and ownership relationship, with the enterprise (main shareholder). Moreover, we include characteristics of the enterprise's size, such as value of average assets and dummy variables for number of workers (large, medium, and small).[16] Other characteristics of the enterprise include: export, formality indicators (registration with government), social capital (membership with guilds), training, information technology (Internet), and acquisition of new technologies.

For both individual entrepreneurs and enterprises, economic conditions in the municipality (state for enterprises) are captured by log of population, the share of agricultural workers, and the number of different types of lenders (individuals only). These variables control for agrarian conditions, market size, and infrastructure availability. The model also includes a set of region dummy variables to capture regional differences in both climate and infrastructures, both of which affect the demand and supply of loans. The availability of loans, and hence their opportunity cost, may vary with municipality size and other characteristics of the municipality. The number of different types of lenders in the municipality captures proximity to lenders, and financing costs.

Demand identification variables (Z). A crucial part of this model is the "identification" assumption—the assumption that some variables influence one equation but not the other. Fortunately, the richness of the survey allows us to make such assumptions. We argue that some of the characteristics of individual entrepreneurs and enterprises that are available in the survey are likely to be correlated with their demand for loans, but unlikely to be observable by lender and therefore would not influence the lender's decision on granting the loan.[17] Since these characteristics are not influencing the lender's decision on access, they are not likely to enter in the "access" (or supply) equation.

We grouped the "identification variables" in four categories. Below we discuss each of the variables and the intuition for their selection. In Table 5 we present a univariate t-test for our demand identification variables that helps to separate agents with demand and without demand for loans. Indeed, we find that most demand identification variables are statistically different for agents with demand and those without demand.

The first category captures the *entrepreneurial abilities* of the individual; those with better abilities will likely to have more demand (for example, for expanding and improving the business). Such variables include (a) an indicator of whether the individual has taken preliminary steps before starting the business (which shows their enthusiasm and the level of preparation); and (b) whether they have inherited a business or a farm (those who did are less likely to have entrepreneurial spirit than those who started the business on their own accord). We find that these two variables increase demand for loans.

The second category captures the *need for funds*. Farmers and microentrepreneurs may need funds because of adverse situations (shocks), or because the business is expanding. For individual entrepreneurs we include indicators of the incidence of adverse events, such as death or illness of household members, loss of income, or climatic shocks that occurred in the last three years. For enterprises we use indicators

[16] The survey design stratified enterprises by number of workers, including four categories: large, medium, small, and micro. See INEGI (2002) for details.

[17] In addition we need to assume that people who expect to be rejected do not apply for loans. This is a reasonable assumption given our observations in the previous section.

of reported problems that will result in a demand for funds. For example, if clients are late in making payments to the enterprise, or if the firm is late in its payment to suppliers, or the firm has experienced drop in earnings, it is likely that the enterprise would have a higher demand for funds. All these indicators are associated with increase in demand (except that the "clients paying late" is a really weak indicator).[18]

As an indicator of *expansion prospects* we use as a measure of whether the owner is planning to make improvements in the business, which strongly predicts more demand for both individual entrepreneurs and enterprises. For individual entrepreneurs we added an indicator of "no demand"—a dummy equal to one if respondents said they did not purchase any new assets because they did not need to (and since they did not need the new assets, it is likely they did not need much external funds). Finally, we consider two additional indicators of the need for funds. For individual entrepreneurs we use as an indicator whether they consider the present economic situation of the family to be better than five years ago. This turns out not to significantly predict demand. For enterprises we create an indicator for whether they claim to have no problems in commercializing their products. We see that those who claim no problem are likely to have less demand (because they are more likely not to want to make any major changes in the business).

The fourth category contains variables capturing *wealth*, but is not observable to the lender. Individual entrepreneurs with more wealth are likely to have less need for external funds. As proxies for wealth we use the variables that were determined at the start of the business and therefore could be considered exogenous at the time of the loan application. For individual entrepreneurs we use two indicators: whether they have purchased a house with their own resources and whether they used personal savings to start a business (the latter is only available for microentrepreneurs). Both variables are negatively related to demand, as expected. For enterprises we use whether over 50 percent of the funds to start the business came from own resources. We do find that those who used their own resources are likely to have less demand for external funds (this is only significant for agricultural enterprises).[19]

6.2 Empirical results

Individual entrepreneurs

In this section, we concentrate the analysis on the partial derivates of the regressors on each of the three participation outcomes, pointing out differences between formal and informal markets. Table 6a through 6d report those partial derivatives evaluated at mean values of the explanatory values. Thus, the empirical results can be interpreted as those of the "average" farmer or microentrepreneur. Below we discuss only variables that have significant coefficients, which is indicated by the p-values reported in brackets next to the partial derivates.

[18] We also consider those who state that excessive competition is a problem and those that complain of inadequate demand, but do not find them to be significant.

[19] We explore another indicator: whether over 50 percent of the funds to start the business came from inheritance. But there are no more then 2 percent of those who used inheritance as over 50 percent of funds at the start of the business, and thus we do not use this variable.

Who demands loans?

The profile of microentrepreneurs or farmers with a higher propensity to demand formal loans is broadly similar to those demanding informal loans. This suggests that entrepreneurs' demand for loans is not tied to a specific provider, but rather associated with business, personal, and household needs.

Microentrepreneurs more likely to demand loans have the following characteristics. *Education*: More educated microentrepreneurs are more likely to demand loans. The probability of demanding loans from formal lenders would increase by 9.7 percentage points with primary education and by 6.4 percentage points with secondary education (significant at 11 percent). The estimated effects are similar for demanding informal loans. *Age*: A lower demand for loans is more likely in the tails of the age distribution of microentrepreneurs. The results show an inverse U-shape relationship between age and demand for loans, suggesting that middle-age microentrepreneurs are more likely to demand loans. Younger microentrepreneurs may be uncertain about their true business possibilities and thus their demand for loans may be lower.[20] Older microentrepreneurs may have less uncertainty about their entrepreneurial abilities but no plans to expand, thus lowering their demand for borrowing. *Gender*: Male microentrepreneurs do not have a significantly different demand for formal loans after controlling for other variables, although they are marginally less likely to demand informal loans (significant only at about 14 percent). *Labor market experience*: Microentrepreneurs that reported previous experience as salaried workers are more likely to demand loans (about 5.5 percentage points).

Farmers more likely to demand loans have the following characteristics. *Selling strategy*: Farmers selling outside the municipality or through informal traders (coyotes) are more likely to demand loans. These results suggest that marketing strategies pursued by farmers are associated with a need for external funds. It is possible that to sell outside the municipality, farmers may need to incur transportation costs, increasing their demand for loans at the time of selling. *Irrigated land*: Farmers working irrigated land may have a higher demand for loans due to their larger size of operations and their need to pay for irrigation services. *Livestock and subproducts*: Lastly, farmers that produce subproducts from their agricultural and livestock productions are less likely to demand loans. Farmers may engage in those activities to generate additional income, decreasing their demand for external funds.

Indicators of participation in savings markets and use of trade credit affect the demand for loans for both farmers and microentrepreneurs, suggesting interactions between different financial instruments. Individual entrepreneurs that have *formal savings* seem to have a lower demand for informal loans (about 14 percentage points for farmers and 9.5 percentage points for microentrepreneurs), but they do not have a lower or higher demand for formal loans. This can be interpreted as a possible substitution between formal savings and informal borrowing to cope with adverse events. Participating in *informal savings* markets increases the likelihood of demanding informal loans for both farmers and microentrepreneurs (9.2 and 6.1 percentage points, respectively), and of demanding formal loans for microentrepreneurs only (7 percentage points). *Buying inputs on credit* increases the likelihood of demanding loans (significant at the 15 percent level for formal lenders) for both farmers and microentrepreneurs. It seems that individual entrepreneurs that have access to trade credit may have unexpected cash flow demands, and thus tend to demand more loans. *Selling goods or services on credit* increases the demand for loans for farmers (about

[20] Household-induced demand for loans may be also lower for younger individual entrepreneurs.

12.6 percentage points for formal lenders and 11.7 percentage points for informal lenders). Farmers selling on credit may demand loans to finance a possible maturity mismatch between incoming funds from client payments and payments for input purchases. In contrast, microentrepreneurs that sell on credit are less likely to demand formal loans (about 5 percentage points).

We find that size, formality, and social capital indicators are not statistically significant in explaining the demand for loans. In particular, the value of assets, the presence of workers, registration with government agencies, membership to guilds, or age of the business are not related with the demand for loans for both farmers and microentrepreneurs.

Among the household characteristics, we find that receiving remittances increases the demand for informal loans. This is somewhat counterintuitive as remittances provide extra funds that could be used for investment. The likely reason is that remittances are used as implicit collateral in informal lending and allow recipients to leverage up the amounts received as remittances to obtain additional (informal) loans. Furthermore, it is possible that remittances and informal borrowing are substitute strategies when dealing with adverse events. Receiving PROCAMPO transfers does not influence the demand for loans of farmers.

Variations across regions and type of municipality affect the demand for loans. Excluding the demand for informal loans of microentrepreneurs, individual entrepreneurs located in more agrarian municipalities have a lower propensity to demand loans as well as those in larger municipalities. In terms of regions, the regression result shows that microentrepreneurs in the Center, Center-west, and Northwest regions are less likely to demand loans. Farmers located in the Center region are less likely to demand loans.

We find that adverse events appear to trigger a higher demand for loans. Not surprising, those farmers reporting a climatic shock will demand more loans to cope with adverse consequences associated with those types of shocks. In the case of microentrepreneurs, health and household income shocks increase the likelihood of demanding formal or informal loans. These findings suggest a potential role for loan markets in assisting farmers to cope with systemic or idiosyncratic shocks.

Another interesting finding is that individual entrepreneurs with more entrepreneurial ability or expansion prospects are more likely to demand loans. For example, labor market experience, which is a proxy for entrepreneurial ability, will increase the probability of demanding loans (of any type) for both microentrepreneurs and farmers. Furthermore, those microentrepreneurs that took preliminary steps to start the business, another proxy of entrepreneurial ability, are more likely to demand informal loans only. As expected, those individual entrepreneurs that reported lack of opportunities to make fixed investments in their operations are less likely to demand loans.

Who is credit constrained?

Microentrepreneurs: characteristics affecting the probability of being credit constrained from formal lenders. *Salaried work experience*: They report having previous experience as salaried workers (about 5.6 percentage points more likely). *Age*: Furthermore, age positively affects the incidence of credit constraints from formal lenders with an inverted-U relationship, suggesting that middle-age microentrepreneurs are

more constrained. *Formal education*: More educated microentrepreneurs present a higher propensity to be credit constrained: 9.6 percentage points more likely for those with primary education and 6.5 percentage points more likely for those with secondary education (significant at 11 percent).[21] *Assets*: Consistent with the literature, we find that less wealthy microentrepreneurs are more likely to be credit constrained. For example, a 1 percent increase in asset value would result in a reduction of the credit constrained probability of 0.8 for microentrepreneurs. *Formal savings*: Having formal savings is another indicator of wealth (financial), and thus, we also find a negative effect. For the average microentrepreneurs, not having formal savings increases the likelihood of being credit constrained by 5.3 percentage points (significant at 11 percent). *Informal savings*: However, participating in informal savings mechanisms increases the odds of being credit constrained from formal lenders (about 4.9 percentage points). This is likely a reverse causality: those credit constrained in formal sector are more likely to participate in informal savings. *Trade credit*: Buying inputs on credit increases the likelihood of being credit constrained by 5.3 percentage points. *Selling on credit*: However, those selling goods on credit are less likely to be credit constrained from formal lenders. *Adverse events*: Lastly, microentrepreneurs affected by adverse events, such as death or illness of household members (health shocks), loss of income (household income shocks), or climatic shocks are more likely to be credit constrained from formal lenders.

Microentrepreneurs: characteristics affecting the probability of being credit constrained from informal lenders. The likelihood of being credit constrained from informal lenders is influenced by a smaller set of variables. *Gender*: Female microentrepreneurs are more likely to be credit constrained from informal lenders (about 4.8 percentage points). *Formal savings*: Having formal savings, a proxy of wealth, decreases the likelihood of being credit constrained from informal lenders (significant at 14 percent level), suggesting a wealth effect. *Selling on credit*: Those microentrepreneurs that sell their goods on credit are also less likely to be credit constrained (about 6.8 percentage points). *Adverse events*: Lastly, microentrepreneurs affected by adverse events, such as death or illness of household members (health shocks), or loss of income (household income shocks) are more likely to be credit constrained from informal lenders.

Farmers: factors associated with the likelihood of being credit constrained from formal lenders. *Salaried work experience*: Similar to microentrepreneurs, farmers with previous salaried work experience are more likely to be credit constrained (about 7.1 percentage points). *Livestock production*: Moreover, when farmers are involved in livestock production, their chances of being credit constrained from formal lenders increases by about 5.8 percentage points. *Selling on credit*: In contrast to the findings for microentrepreneurs, farmers that sell on credit are more likely to be credit constrained from formal lenders (about 12 percentage points). *Climatic shocks*: Farmers affected by climatic shocks are more likely to be credit constrained (about 10 percentage points). *Entrepreneurial spirit*: Indicators of entrepreneurial spirit, such as taking preliminary steps to start the business or planning to make improvements in the business, increase the odds of being credit constrained.[22] *Remittances*: Farmers receiving remittances are more likely to be credit constrained (about 6.7 percentage points).

[21] Because more educated microentrepreneurs are also more likely to demand loans, thus it is not surprising to find that they have a higher incidence of credit constraints.

[22] Because farmers that took preliminary steps and are planning to make business improvements are also more likely to demand loans, it is not surprising to find that they have a higher incidence of credit constraints.

We observe vast regional variations in the likelihood of being credit constrained. Microentrepreneurs located in the Center, Center-west, and North-west regions are less likely to be credit constrained from both formal or informal lenders. In the case of farmers, region matters only in the case of informal lenders. The Northeast region is less likely to be credit constrained.

Regional economic conditions seem to affect the incidence of credit constraints. Farmers and microentrepreneurs that live in more agrarian municipalities are less likely to be credit constrained from formal and informal lenders, but as indicated in the previous section, they also have less demand overall. The results also show regional differences in the extent of credit constraints. For example, microentrepreneurs located in the Center, Center-west, and North-west regions are less likely to be credit constrained. Similarly, farmers located in those regions have less chance of being credit constrained from informal lenders. Only farmers residing in the Center region have a smaller likelihood of being credit constrained from formal lenders. An interesting finding is that farmers and microentrepreneurs do not face a higher degree of credit constraints by operating in the South & Southeast region.

In summary, the results show that those more likely to be credit constrained are also more likely to demand loans. This seemingly counterintuitive result could possibly be explained by the combination of two forces: (a) the predicted and actual proportions of receiving formal and informal loans are very small, and thus the model captures the relevant variables that identify the demand for loans; and (b) formal and informal lenders could build their lending decisions on unobservable factors that are not captured by the variables included in the model. Another finding is that the marginal effects on the probability of being credit constrained are larger for farmers than for microentrepreneurs for the significant variables.

Who receives loans?

Farmers more likely to receive formal loans have the following characteristics. *PROCAMPO benefits* significantly increase the likelihood of access to formal loans to farmers, possibly because formal lenders use these benefits as implicit collateral. *Ethnicity*: They do not speak indigenous languages, possibly indicating language barrier. *Formality indicators* are associated with better access to formal loans. Indeed, registration with government agencies and membership with guilds increases access to formal loans by 4.3 and 2.8 percentage points, respectively. *Training or technical assistance*: Furthermore, we find that receiving training or technical assistance is associated with better access to formal loans, suggesting some complementarities between formal loans and training. *Certified seeds*: Farmers who use genetically improved crops have more access to formal loans, likely because using genetically modified crops is associated with higher productivity and therefore higher cash flows. *Livestock production*: Farmers that do not engage in livestock production are about 2.3 percentage points more likely to borrow from formal lenders. *Irrigated land*: Farmers working irrigated land are more likely to receive formal loans (significant at 13 percent). *Regions*: We did not find regional differences in access to formal loans. The only exception is that farmers in urban areas are less likely to receive formal loans (significant at 11 percent).

Farmers that borrow from informal lenders have different characteristics than those borrowing from formal ones. *Education and salaried work*: We find that farmers that worked as salaried workers and do not have formal education tend to borrow more from informal lenders. *Coyotes*: Furthermore, farmers that sell through informal traders (coyotes) have a greater propensity to borrow from informal lenders (about

2.9 percentage points). *Assets and formal savings*: A surprising finding is that farmers with more assets and with formal savings borrow more from informal lenders, which may reflect a particularity of the survey data. *Regional variations*: Lastly, we find significant regional variations in access to informal loans. Farmers located in the more populated and more agrarian municipalities have better access to informal lenders. Informal lenders are more likely to grant loans to farmers located in the South & Southeast, Center, Center-west, and Northwest regions.

Microentrepreneurs receiving loans from formal lenders present the following characteristics. They are more likely to be male (significant at 12 percent), are middle-aged, sell outside the municipality (significant at 12 percent), work in manufacturing, have formal savings, have informal savings, register with government agencies (significant at 11 percent), and have younger operations. Microentrepreneurs located in the Center region have less access to formal loans whereas those located in the Center-west have more access.

Microentrepreneurs receiving loans from informal lenders are more likely to receive remittances, have experience as a salaried worker, are middle-age, have more education, have younger operations, do not have formal savings, have informal savings, made sales on credit, and bought inputs on credit. We find some regional differences. Microentrepreneurs located in the South and Southeast and Center-west regions have greater propensity to borrow from informal lenders as well as those residing in larger and more agrarian municipalities.

There are some surprising findings with respect to access to informal lenders. First, the results indicate that more educated microentrepreneurs and farmers with more assets are more likely to borrow from informal lenders. This is contrary to the prior belief that informal lenders serve "worse-off" individual entrepreneurs or smaller businesses. Another surprising finding is that access to formal lenders does not present regional variations for farmers.

Enterprises

In this section, we concentrate the analysis on the partial derivates of the regressors on each of the three participation outcomes, pointing out differences between formal and informal markets. Table 6e and 6f report those partial derivatives evaluated at mean values of the explanatory values. Thus, the empirical results can be interpreted as those of the "average" enterprise. Below we discuss only variables that have significant coefficients, which is indicated by the p-values reported in brackets next to the partial derivates. We report estimations combining both agricultural and nonagricultural enterprises because the data contain the same explanatory variables. However, to account for unexplained differences across economic sector, we include two dummy variables to distinguish agricultural and manufacturing enterprises from enterprises in other economic sectors.

Who demands loans?

Similar to the results for individual entrepreneurs, we find that indicators of business size or business age do not influence the demand for loans. This suggests that small and medium-size enterprises are not more likely to demand loans than large or micro ones or that younger enterprises demand more loans than older ones.

Firms that export, plan to make improvements in the business, buy on credit, and report some problems are also more likely to demand loans. Enterprises exporting their production are about 7.4 and 9.6 percentage points more likely to demand formal and informal loans, respectively. To export, enterprises may need additional sources of funding. Firms than plan to introduce changes in their operations, such as product differentiation, new markets, or reduce costs, are more likely to demand formal loans (about 6.3 percentage points). Buying on credit increases odds of demand for loans (10.6 percentage points for formal loans and 8.4 percentage points for informal loans). Firms reporting problems, such as low selling prices, low earnings, or commercialization obstacles, are more likely to demand loans.

The demand for loans varies across regions and economic sector. Enterprises located in the South & Southeast region are about 12 percentage points more likely to demand loans. Agricultural enterprises tend to demand more loans (about 12.6 percentage points more likely). When they are located in urban areas the probability to demand loans is only 3.4 percentage points higher. Manufacturing firms are not more likely to demand loans.

Less formal enterprises are more likely to demand informal loans. We find that enterprises that do not use external auditors, are not registered with government institutions, and do not offer training to their workers, are 6 to 14 percentage points more likely to demand informal loans.

There are some surprising results. A surprising result is that enterprises with managers with more formal education tend to demand fewer loans. Another surprising result is that enterprises registered with government institutions are less likely to demand formal loans. This suggests that larger enterprises, which are mostly registered with government institutions, prefer to rely on internal source of funds, maintaining control of their enterprises. A somewhat surprising result is that the use of technology and innovations is not significant. It is likely that the effect of the technology is likely to be captured by other variables included in the regression, such as size and manager education.

Who is credit constrained?

Similar to the results for individual entrepreneurs, enterprises with more productive assets (larger) and with formal savings are less likely to be credit constrained from formal lenders. For example, a one percent increase in an enterprise's assets would reduce the probability of credit constraints from formal lenders by 3.2 percentage points. For the average enterprise, having formal savings reduces the chances of being credit constrained by 8.4 percentage points, suggesting that those without formal savings are significantly more constrained from formal lenders.[23] By contrast, we do not observe a wealth/size effect for being credit constrained from informal lenders. Another interesting finding is that after controlling for wealth, firm size measured by the number of employees does not affect the likelihood of being credit constrained for the average enterprise.

Older enterprises are less likely to be credit constrained. For the average enterprise, the chance of being credit constrained is about 8 percentage points lower for 7-10 year old enterprises (for informal lenders)

[23] Indeed, about 42 percent of enterprises without formal savings are credit constrained compared to 22 percent of their counterparts with formal savings.

and about 8.6 percentage points for 11-15 year old enterprises (for formal lenders). It is possible that enterprises in the 7-15 year old bracket have proven their potential, and thus have accumulated internal funds.

Membership with an economic group decreases the incidence of credit constraints. Being a part of the economic group decreases the magnitude of constraints from informal lenders by about 7 percentage points for the average enterprise. This suggests that those companies are also more likely to receive informal loans, possibly from their parent company. Furthermore, enterprises that belong to an economic group are about 4.4 percentage points less likely to be credit constrained from formal lenders (significant at 11 percent level).

After controlling for other firm and regional characteristics, the economic sector of activity is not an important determinant of the propensity of being credit constrained. We find that agricultural enterprises have more demand for formal loans, while they are not differently constrained than the nonagricultural enterprises. Agricultural enterprises in urban areas are less likely to be credit constrained from informal lenders (significant at 13 percent level).

Regional economic conditions affect the incidence of credit constraints. Enterprises located in states with more people working in the agricultural sector are less likely to be credit constrained. For the average enterprise, the probability of being credit constrained from formal lenders is about 20 percentage points higher if located in the South & Southeast. Enterprises located in the Center, Center-west, and Northwest regions are less likely to be credit constrained from informal lenders.

Who receives loans?

The empirical model shows that enterprises that are more likely to receive formal loans have the following characteristics: have more assets, have been in operations for more than 25 years (significant at 11 percent), export (significant at 12 percent), have a main shareholder managing the firm (9 percentage points), buy or sell goods on credit (8-9 percentage points), have formal savings (9 percentage points), report using the Internet for the business (7.3 percentage points), plan to make improvements in the business (5.8 percentage points), and report some problems in their operations (6- 9 percentage points). We find that a firm's total assets have the strongest correlation with receiving formal loans, suggesting that formal lenders cater to larger enterprises. In addition to indicating a wealth effect, having formal savings allows formal lenders gather information about their clients by examining their savings behavior with formal institutions.

Enterprises more likely to borrow from informal lenders have the following characteristics: foreign owners (5.8 percentage points), managers without college education (7.4 percentage points), have more employees, have been in operations for more than 25 years, are members of an economic group (6.1 percentage points), buy on credit (6.6 percentage points), have formal savings (5.4 percentage points), do not use external auditors (8.2 percentage points), are registered with guilds or chamber of activities (4.3 percentage points), and report problems in their operations. It is reasonable to find that firms that are part of economic groups are significantly more likely to receive informal loans because informal loans are likely to come from those groups.

Some regions and economic sectors are more likely to receive loans. Agricultural enterprises are about 15.4 percentage points more likely to borrow from formal lenders, but if located in urban areas they are less likely to receive formal loans (10 percentage points). Enterprises located in the South & Southeast, Center, Center-west, and Northwest regions have more access to informal loans. However, enterprises operating in the South & Southeast, Center, and Northwest regions are less likely to borrow from formal lenders. This suggests a differentiate pattern between formal and informal lenders.

The regression results present some surprising findings. We find that enterprises registered with government agencies and with foreign owners are less likely to receive formal loans. Another surprising finding is that enterprises with more workers are more likely to borrow from informal lenders.

7. Investment and credit constraints

We start our analysis of investment in Table 7a and Table 7b, which report the proportion of survey respondents that undertook any investment in capital goods in recent years and the ratio of investment to fixed assets.[24] For registered enterprises we scale the value of investment in each year by the net value of total fixed assets in that year. For households we estimate the value of fixed assets by taking the sum of estimated replacement value of owned machinery and equipment, vehicles, or real estate, which gives us a rough equivalent to the value of fixed assets on the enterprise balance sheet. Then we scale the value of new purchases (which has been translated to 2002 pesos using inflation rates) by the estimated value of fixed assets. Similarly, we scale investment in land by the current value of land. This produces a ratio, which gives us percent of additional (new) investment relative to existing stock of machinery and equipment. We refer to this ratio as investment to capital ratio, denoted by I/K.

A small number of individual entrepreneurs made investments compared to enterprises. As shown in Table 7b, microentrepreneurs show a higher incidence of investment than farmers (37 percent versus 27 percent), which is partly attributed to differences in economic activity. At the other extreme, most enterprises (close to 80 percent) have invested in machinery and equipment in the past two years. [25] Land markets appear inactive because less than 5 percent of farmers purchased land in the past five years.[26]

The incidence of investment varies widely across regions, especially among individual entrepreneurs. Farmers and microentrepreneurs located in the Center region present the lowest incidence of investment in Mexico, 11 percent and 26 percent, respectively, which is about 1.4 and 2.6 times lower than the national average. Those living in the South & Southeast region are more likely to invest than their counterparts in the rest of the country. In the case of enterprises, regional variations are less pronounced, but still enterprises in the Center-west region are slightly more likely to have invested in the past two years.

Individual entrepreneurs and enterprises invest small amounts relative to their existing stock of fixed assets. As shown in Table 7b, the median investment to capital ratio, for those agents with investment, is

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[24] The time horizons are different for different respondents. For the household sample we have indicators and amounts of investment in machinery and equipment during the past 3 years, and investment in land during the past 5 years. For the amount of investment we translate all values into current 2002 pesos to make them comparable with the current replacement value of assets. For enterprises we have investment in each of the two last years—2000 and 2001. For comparison with households in Table 7a we give summary statistics for the two-year average investment for the registered enterprises.

[25] When we look at each year separately, the proportions of enterprises investing are very similar.

[26] This also presents difficulty for the analysis of land purchase decisions, as the sample size is very small. As a consequence, most of the results for the land purchase are not significant.

about 10 percent-17 percent. Farmers and agricultural enterprises located in the Center region tend to invest less, relative to their assets than their counterparts in the rest of the country. In the case of farmers purchasing land, we observe that the investment to capital ratio is substantially larger. This could be because current land values are excessively higher than existing land, or because land purchases tend to be larger because of indivisibility.

Are credit constraints associated with the incidence of investment and to the investment to capital ratio? In Table 7a, we report the percent of people with investment in each of the loan market participation categories studied in section 6: no demand, credit constrained (demand but not apply and rejected), received formal loans, and received informal loans.[27]

Microentrepreneurs and farmers that borrowed from formal or informal lenders are significantly more likely to make investments into productive assets and land than nonborrowers. Moreover, those borrowers from informal lenders are more likely to invest than those borrowers from formal lenders. This is a surprising result because entrepreneurs report using formal loans for investment in more occasions than informal loans both in terms of amounts or number of transactions. Another interesting observation is that credit-constrained individual entrepreneurs tend to invest more than those without a demand for loans. This result could reflect the reverse causality: that those who make investment are more likely to have demand for loans (and hence those who do not require new investment are more likely to have no demand for funds). In addition, credit-constrained individual entrepreneurs still might have at least some access to alternative sources of funds (such as retained earnings and their own savings). Therefore it is not very surprising that people with demand (including credit-constrained individual entrepreneurs) make more investments than those without demand.

In the case of enterprises, we also find that the incidence of investment is higher among borrowers from formal or informal lenders than nonborrowers with the exception of nonagricultural enterprises borrowing from formal lenders. A somewhat surprising result is that credit-constrained agricultural enterprises present a lower incidence of investment than their counterparts with no demand for loans. For the nonagricultural enterprises the difference is not significant. In the case of agricultural enterprises this suggests that the self-reported indicator of loan demand may not necessarily reflect investment opportunities, in contrast with the findings for individual entrepreneurs. Finally, enterprises borrowing from formal lenders are more likely to invest than their counterparts receiving informal loans and nonborrowers.

7.1 Individual entrepreneurs

What determines whether microentrepreneurs or farmers invest? What factors affect the size of investment? This section explores these questions for investment in capital goods (machinery and equipment) and in land purchases. We study the discrete choice of investment with a probit model and the ratio of amount invested to total owned assets (I/K) with a tobit model, which accommodates for the large proportion of individual entrepreneurs that do not make any investment. The equations estimated are:

(3) Invest = Pr (0=no invest, 1 = invest) = αGROWTH +βEXPECT+γABILITY+δFUNDS+ φFINANCE+ε

[27] Individual entrepreneurs or enterprises borrowing from both formal or informal lenders sources are classified as borrowing from formal lenders. The category of credit constrained includes those individual entrepreneurs or enterprises that are credit constrained from either formal or informal lenders. Using these criteria, we create four mutually exclusive categories of participation in loan markets.

(4) $I/K = \alpha GROWTH + \beta EXPECT + \gamma ABILITY + \delta FUNDS + \varphi FINANCE + \varepsilon$

We posit an investment model based on the following arguments. Two main forces determine investment decisions: (a) opportunities to grow and improve the business; and (b) the availability and cost of funds. In the regression analysis we use several proxies for each of the two main forces.

We proxy for the growth opportunities (GROWTH) with several variables.[28] *First*, firm size may reflect a desire to grow. For example, larger businesses may be more likely to have reached their optimal scale and therefore their opportunities for expansion may be less attractive.[29] We measure firm size by the value of productive assets or total land, as an indicator for whether or not the owner hires workers. *Second*, the ratio of borrowed assets to owned assets suggests available opportunities for expansion. Nonetheless, this variable may capture two opposing forces. On one hand, those who use more rented equipment relative to their own may want to invest, perhaps to purchase the assets they are currently using for production, reducing uncertainties in case they have to return them. On the other hand, those that do not invest will have less owned assets and therefore a higher ratio of rented to borrowed assets. Using similar arguments we use the ratio of borrowed to owned land for the farmers' regression. *Third*, for farmers we also use a dummy variable for whether land has irrigation, which captures land quality and therefore farm productivity. *Lastly*, similar to firm size, older businesses are likely to have reached their optimal scale of operations and thus are less likely to invest

Investment is also driven by the expectations of the future returns (EXPECT). The survey contains some useful indicators. Those individual entrepreneurs that consider that the present economic situation of the household is better than five years ago may expect the future to be brighter. Likewise, those individual entrepreneurs that plan to expand their operations may be more likely to invest. Finally, the state of the life cycle of the entrepreneur would clearly affect its expectation, with older individual entrepreneurs being less likely to invest and more likely to maintain the current scale of their activities.

The entrepreneurial ability of the owner may also influence their investment behavior (ABILITY). Entrepreneurial ability is captured by several variables: a dummy for those who have a labor market experience; a dummy for those who have labor experience in the United States; a dummy equal to one if the owner took preliminary steps before starting the business; and a dummy for participation in a training program (as training programs can possibly improve the ability of the owners and the productivity of the business).

Importantly, the availability of internal funds would also affect investment behavior (FUNDS). In this respect, we include indicators of other sources of funds that have been shown in other studies to reduce credit constraints. For example, PROCAMPO benefits might stimulate investment simply because the benefits are perceived as "additional funds" by the recipient, and can be used for any purpose. Likewise, formal or informal savings represent available funds that could be used for investment.

Most important, we study the effects that access to finance has on investment (FINANCE). To control for access to loans we include dummies for whether individual entrepreneurs have received a formal or

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[28] Actual growth rate of business is one of the best indicators of growth opportunities, as it is likely that fast-growing businesses will have more attractive growth opportunities and would like to expand and invest more. We tried to test the actual growth rate from year 2000 to 2001 and it was positive in some specifications; however, many observations are missing on this variable, and it appears to have substantial measurement problems. Therefore we do not include it in the tables.

[29] Given that we consider very small businesses, this argument is not likely to be binding. However, some people argue that many micro businesses are simply "subsistence" businesses—that owners run these businesses to provide a stable source of income without plans for expansion and growth.

informal loan during that period to see whether those who received loans have more investment. To separate individual entrepreneurs with and without demand, we include a dummy variable that equals one if agents have demand but no application to either source (formal or informal). After we control for those with access to loans, this variable effectively separates those with and without demand for loans. We refer to this indicator as "credit constrained" in the tables. Finally, we control for economic conditions in the municipality of residence and regional differences.

Tables 8a through 8c present the partial derivatives (at mean values) from the estimation of equations (3) and (4) to analyze the investment behavior of farmers and microentrepreneurs. In the case of equation (4) we present the partial derivatives for positive values of the I/K ratio.

Microentrepreneurs and farmers with more potential for growth are more likely to invest in fixed assets as well as to invest more. We find that microentrepreneurs and farmers are more likely to invest if they have better growth opportunities and have more total productive assets (or land value). But those microentrepreneurs who rent or borrow more assets are less likely to invest. This may reflect reverse causality: those who did not invest much have to rent or borrow more assets. Microentrepreneurs that hire workers are 10.7 percentage points more likely to invest and their I/K ratio would be 3.8 percentage points higher. In contrast, farmers that hire workers are 5.1 percentage points less likely to invest in fixed assets and their I/K ratio is not significantly different.

Older microentrepreneurs and farmers as well as microentrepreneurs with older operations tend to invest less than their younger counterparts. Microentrepreneurs with older operations are not only less likely to invest, but also would invest smaller amounts relative to total assets, likely because they have already reached an optimal size of operations. In contrast, farmers with older operations have a higher propensity to invest in capital goods but are less likely to purchase land. Older farmers and microentrepreneurs invest less in capital goods as their prospects for growth may be curbed by their age. However, the age of the farmers is not associated with land purchases.

Indicators of future business plans and positive outlook are significantly related to investment. Microentrepreneurs and farmers who state that the current economic condition of their family is better and those who plan to make improvements in the business are more likely to invest and they also invest larger amounts. Those microentrepreneurs and farmers reporting better economic conditions were 9.8 and 9.7 percentage points, respectively, more likely to invest in fixed assets. In the case of land purchases, the estimated effect is smaller (2.3 percentage points).

Higher entrepreneurial ability is positively correlated with investment. Although those microentrepreneurs that worked in the United States are not more likely to invest, when they do, they invest larger amounts. Previous labor market experience and taking preliminary steps before starting a business influence both the decision to invest and the amount invested of microentrepreneurs. Interestingly, microentrepreneurs who participated in training are significantly more likely to invest and they invest larger amounts. This could indicate a positive effect of training on the productivity and growth potential of the business. However, this could also proxy for unobserved entrepreneurial ability: better entrepreneurs are more likely to participate in training and more likely to invest. Therefore, the result could not unambiguously be taken as a benefit of training, but at least it is suggestive of the positive effects. In the case of farmers, having previous labor market experience would increase the likelihood of acquiring fixed assets but not in purchasing land. The other variables capturing entrepreneurial ability are not statistically significant.

Household indicators of availability of funds are positively correlated with investment decision and amount invested. For example, microentrepreneurs that receive remittances (from inside or outside of the

country) are 7.4 percentage points more likely to invest, but they are not more likely to have higher I/K ratios. Although receiving remittances does not influence investment decisions among farmers, those farmers who obtain PROCAMPO transfers are more likely to invest in fixed assets but not in land. PROCAMPO transfers do not increase the I/K ratio of fixed assets or land. Microentrepreneurs living in wealthy households, proxied by the number of household items, tend to invest more.

Having formal or informal savings is strongly associated with the incidence and size of investment. We find that having informal savings is a significant predictor of the decision to invest for both farmers and microentrepreneurs. For example, the likelihood of investing in fixed assets would increase by 7.2 percentage points for individual entrepreneurs with informal savings, and by 3.3 percentage points in the case of land purchases among farmers. The I/K ratio would increase 2.7 percentage points for microentrepreneurs with informal savings, but not for farmers. Only for farmers, we find that having formal savings is associated with investment. Indeed, the probability of investing in fixed assets and land, respectively, would be almost 17.5 and 10.9 percentage points higher for farmers with formal savings. The I/K ratio is also higher for farmers with formal savings.

Economic sector and variables related to economic conditions have an effect on the decision to invest and amount invested. Microenterprises operating in the commerce sector are less likely to invest but those in the construction sector present a higher incidence of investment. These results are plausible as commerce business is not capital intensive (it does not require much machinery and equipment to operate), while construction business is very capital intensive. However, the economic sector of activity of farmers does not influence investment decisions. Microentrepreneurs and farmers living in more agrarian municipalities are more likely to invest and will invest higher amounts. In terms of regional differences, microentrepreneurs located in the Center region are less likely to invest but farmers in the South & Southeast region tend to invest more than those in the rest of the country.

We discuss the effect of access to finance on investment of farmers and microenterprises in a separate section below.

7.2 Enterprises

In the case of firms, the financial sector literature has extensively studied the effects of financing constraints on investment using two main modeling choices.[30] The first approach examines whether investment is sensitive to firms' cash flows using Tobin's Q framework. Fazarri and others (1988) found that for a sample of a priori constrained firms, investment is more sensitive to firms' cash flows than for their unconstrained counterparts. The authors argued that this finding confirmed their a priori classification of firms as financially constrained. The intuition behind this model is simple. Firms with good investment opportunities, proxied by the ratio of market value of the firm to its book value (Tobin's Q), and that cannot easily access external financial markets, will only be able to invest using internally generated funds. Thus, investment for those firms will fluctuate with their cash flows. A less structural version of this model, dubbed the accelerator model, uses growth rate of sales as a proxy of investment opportunities. Using the accelerator model, Bond and others (1997) find that investment is sensitive to sales growth, indicating credit constraints.

[30] Hubbard (1998) and Schiantarelli (1996) present a comprehensive review of the literature on investment and financing constraints. The investment literature uses term *financing constraints* rather than credit constraints. The financing constraints term is conceptual more general as it extends to both debt and equity constraints. Basically if the firm is constrained in any type of external financing (whether debt or public equity), it is referred to as financially constrained.

A second type of popular model examining investment and financing constraints uses a Euler equation model of investment.[31] Instead of relying on Tobin's Q, the Euler model specifies an intertemporal investment choice model with proxies for growth opportunities (such as indicators of the marginal product of capital) and financing constraints (such as indicators of internally generated funds). Using this type of model to study investment in U.S. agriculture, Hubbard and Kashyap (1992) find evidence of financing constraints. Love (2003) applied the Euler equation model to cross-country data and found that in countries with lower levels of financial development the intertemporal investment choice is adversely affected by the presence of financing constraints.

For registered enterprises we estimate the accelerator model of investment (see, for example, Bond and others, 1997, and Gelos and Werner, 1999, for recent applications of this model). In this model the growth rate of sales serves as a proxy for the investment opportunities. We can estimate a more structural model of investment than the one we used for the household sample because the survey has two years of balance sheet data, allowing us to calculate the ratio of investment to capital for two consecutive years and the sales growth. We estimate the following equations:

$$(5)\quad \text{Invest} = \Pr(0 = \text{no invest}, 1 = \text{invest}) = \delta_1 I / K_{i,t-1} + \delta_1 \Delta SALES_{i,t} + \delta_1 FINANCE_i + \bar{\delta} X_i + e_i$$

$$(6)\quad I / K_{i,t} = \delta_1 I / K_{i,t-1} + \delta_1 \Delta SALES_{i,t} + \delta_1 FINANCE_i + \bar{\delta} X_i + e_i$$

where: *I/K* is investment scaled by the capital stock (time t is 2001 and time t-1 is 2000), $\Delta SALES$ is growth rate in sales (between 2000 and 2001), *FINANCE* is the indicator of access, and *X* is a vector of additional firm characteristics that could help capture the firm-specific levels of investment such as location (region) and industry dummies, and total size of the business (measured by the log of total assets).

The dependent variable is the ratio of investment to capital stock. The model contains a lagged investment to capital term to capture persistence in investment and gradual adjustment of investment to its optimal level due to adjustment costs. The sales growth is the main proxy for the growth opportunities on the premise that past growth is the best predictor of the future growth (this would be the case if the shocks to growth opportunities are serially correlated and if the adjustment of investment takes time). We also control for the sector and the size as most likely additional determinants of the growth opportunities. Given the small number of observations we estimate the regressions for agricultural and nonagricultural enterprises altogether but include the indicator for agricultural enterprises (Agro dummy).

Finally, we study the effects that access to loans has on investment (FINANCE). As in the case of individuals, we include dummies for whether enterprises have received a formal or informal loan during that period to see whether those who received loans have more investment. In addition, we include one dummy variable if enterprises are credit constrained from either formal or informal lenders (demand but not applied or rejected).

Tables 9a and 9b present the partial derivatives (at mean values) from the estimation of equations (5) and (6) to analyze the investment behavior of enterprises, respectively. Table 9b presents the partial derivatives of the I/K ratio conditional on positive values. To evaluate whether the investment behavior of agricultural enterprises is related to their access to loans or the incidence of credit constraints, we interact the FINANCE variables with the dummy variable for the agricultural sector (Agro dummy). In Model 1

[31] This model is also reviewed by Hubbard (1998).

we interact the credit constrained dummy with the Agro dummy while in Model 2 we combine access to formal and informal loans into a single dummy variable. In Models 3 and 4 we interact the access variables (receiving loans) with the Agro dummy variable.

As an additional test of credit constraints, we look at the sensitivity of investment to cash flow. This test has been widely used in the investment literature, starting with the pioneering paper by Fazzari and others (1988). The intuition behind this test is simple: in the absence of credit market imperfections the only determinant of investment should be the growth opportunities (proxied here by the sales growth). The reason is that in the market without imperfections a firm with good growth prospects should be able to raise sufficient external funds to invest in its growth opportunity. However, if access to credit is imperfect, the firms will be more likely to invest when they have high cash flows. In other words, the availability of internal funds will be a predictor of investment behavior and the sensitivity of investment to availability of internal funds (proxied by the cash flows) is a measure of financing constraints. The model is given by the same equation as above, but instead of access indicators we substitute the cash flows (scaled by total assets). Finding a positive coefficient on cash flow suggests that firms invest more when they have more internal funds and is indicative of credit constraints. Model 5 in Tables 9a and 9b interact the Agro dummy with the cash flow variable.

Mexican enterprises behave as predicted by the theoretical and empirical literature. The regression results show that both the decision to invest and the investment to asset ratio are positive and strongly associated with the lagged I/K and sales growth for various specifications. Furthermore, we find evidence that larger enterprises (proxied by total assets) are more likely to invest, as well as to have higher I/K ratios. Economic sector influences the I/K ratio but not the likelihood of investing. For agricultural and manufacturing enterprises, their I/K ratio will be 1.7 and 2.9 percentage points lower, respectively. In terms of regional differences, enterprises located in the Center-west region tend to invest more as well as to show larger I/K ratios. Those enterprises located in the Center region are less likely to invest but their I/K ratio is not different from their counterparts in other regions.

In contrast with the findings of section 6.2, agricultural enterprises appear more credit constrained than their nonagricultural counterparts. The regression results show that the I/K ratio is sensitive to cash flow only for agricultural enterprises, providing some empirical evidence that agricultural enterprises are more credit constrained. The estimated effect is that the I/K ratio would increase 3.8 percentage points for every additional peso of cash flow of agricultural enterprises, but there is not a statistically significant effect for enterprises in other economic sectors.

7.3 Does participation in loan markets affect investment behavior?

One of the most important policy and research questions regarding credit markets is whether improved access to credit would result in positive changes in investment outcomes. This quantification of impact is important to guide policy discussion on the allocation of public finds and to highlight complementarities of interventions on various fronts. To study the effects that access to finance and credit constraints have on investment, the investment equations discussed previously included a set of dummy variables. These variables identify individual entrepreneurs or enterprises that received formal loans only or in combination with informal loans, received informal loans only, and that are credit constrained from either formal or informal lenders.[32] Thus, we can distinguish their investment pattern from those individual

[32] As presented in Section 4, the percentage of individual entrepreneurs or enterprises borrowing from both formal and informal lenders is very small. We created mutually exclusive categories for clarity purposes.

entrepreneurs or enterprises without a demand for loans. An examination of those variables provides a first attempt to measure the effect of credit constraints on investment behavior.

The findings presented below should be interpreted with caution because of the problem of self-selection into participating in loan markets. Although we may find a positive correlation between participation in loan markets and investment behavior, the coefficient may not necessarily show the impact of access to finance: those individual entrepreneurs borrowing from formal or informal lenders may be more likely to invest whether or not they receive loans. It is likely that the factors affecting the decision to invest would also influence the decision to borrow. In this context, the estimated coefficients would overestimate the effect of receiving formal or informal loans on investment. Nonetheless, if we find that the participation coefficients are not significant, this means that there is no association between borrowing and investment behavior.

The empirical results presented in Tables 8a through 8c show that microentrepreneurs and farmers receiving informal loans are more likely to invest and would have higher I/K ratios, but farmers would not necessarily buy more land. For the average microentrepreneur, the probability of investing and the I/K ratio would be 11.8 and 3.6 percentage points higher for those borrowing from any lender, respectively (Model 2). In the case of farmers, the estimated effects are substantially lower, the propensity to invest in assets and the I/K ratio will increase 7.5 and 2.4 percentage points, respectively (Table 8b, Model 2). Credit-constrained individual entrepreneurs do not have a different investment behavior than their counterparts without a demand for loans. Lastly, investments in land are not related with borrowing from formal or informal lenders.

For enterprises, the regression results presented in Tables 9a and 9b show that the incidence of investment is higher for those borrowing from formal lenders. The partial derivatives results show that enterprises borrowing from formal lenders are 6.4 percentage points more likely to invest (Model 1), consistent with the findings presented in Table 3c. Furthermore, we find that agricultural and nonagricultural enterprises present a similar incidence of investment regardless of their borrowing status. Credit-constrained enterprises are not more likely to invest.

Nonetheless, we find that the I/K ratio is about 2–3 percentage points higher for enterprises borrowing from formal or informal lenders and that are credit constrained. Because those enterprises report having a demand for loans, it is not surprising to find that their I/K ratio is larger. Agricultural enterprises that are credit constrained present a lower I/K ratio (significant only at 15 percent) than their nonagricultural counterparts (Model 1 and Model 2). When examining whether borrowing from formal or informal lenders affects differently agricultural and nonagricultural enterprises, we find that only agricultural enterprises borrowing from informal lenders (Model 3) or from any lender (Model 4) will show a higher I/K ratio (significant only at 15 percent).

In contrast with the findings of Section 7, agricultural enterprises appear more credit constrained than their nonagricultural counterparts. The regression results show that the I/K ratio is sensitive to cash flow only for agricultural enterprises, providing some empirical evidence that agricultural enterprises are somehow credit constrained. The estimated effect is that the I/K ratio would increase 3.8 percentage points for every additional peso of cash flow of agricultural enterprises, but there is not a statistically significant effect for enterprises in other economic sectors.

We use the empirical results presented in Tables 8a through 9b to estimate the effect of offering formal or informal loans to credit-constrained individual entrepreneurs or enterprises. We find that removing credit constraints would have its largest effect on the number of individual entrepreneurs that invest and on the I/K level of enterprises. To estimate the effect of removing credit constraints on investment behavior, we

use regression coefficients to estimate the effect of offering formal or informal loans to the average individual or enterprise assuming that they are credit constrained. We evaluate the partial derivatives at the mean values of all variables but the FINANCE variables and present the results in Table 10. Table 10 illustrates that excluding microentrepreneurs, the estimated effect of removing credit constraints on the incidence of investment is slightly higher for formal loans than for informal loans. Furthermore, the estimated impact is higher for individual entrepreneurs than for enterprises. Regarding the I/K ratio, offering formal or informal loans would result in a small increase. Had there been no credit constraints during the period covered by the surveys, the percentage of microentrepreneurs and farmers making investments would have been about 31 and 35 percent higher, respectively. The estimated effects on the I/K are smaller: 10 percent for microentrepreneurs and about 8 percent for farmers. In the case of enterprises, the estimated effects are more modest as the incidence of credit constraints is lower than for individual entrepreneurs. Removing credit constraints for enterprises would result in 3-9 percent increase in the number of enterprises investing and in 4-19 percent higher I/K ratio.

8. Concluding remarks

In this paper, we provide new evidence about the extent of credit constraints and whether credit constraints affect investment decisions. We find that the low participation rates in loan markets are partially attributed to a weak demand for loans. The empirical findings of the survey data dispute the commonly held belief that low participation rates in loan markets result from an insufficient supply of loans. About 53 percent of microentrepreneurs, 57 percent of farmers, 49 percent of nonagricultural enterprises, and 61 percent of agricultural enterprises present a self-reported demand for loans. The proportion of agents demanding formal loans is higher than the fraction demanding informal loans for all but microentrepreneurs.

Nevertheless, the incidence of credit constraints is pervasive across Mexico, especially among individual entrepreneurs. We find that about 37 percent of microentrepreneurs, 41 percent of farmers, 19 percent of nonagricultural enterprises, and 21 percent of agricultural enterprises are credit constrained from both formal and informal lenders. The incidence of credit constraints is higher for formal lenders than for informal lenders among individual entrepreneurs. In contrast, for enterprises, the degree of credit constraints is slightly higher for informal than for formal lenders. [33]

Credit-constrained agents have an unmet demand for loans because the loan contracts offered by formal and informal lenders do not match their needs and because of self-selection out of credit markets because of the process involved in obtaining loans.

We find that the market penetration of formal and informal lenders in loan markets is in a dire state, especially for farmers and microentrepreneurs. For example, private banks reach about 2 percent of individual entrepreneurs demanding bank loans and 44 percent of nonagricultural enterprises and 46 percent of agricultural ones. Compared to private banks, the outreach of development banks is a bit higher for farmers (4 percent) but substantially higher for enterprises (11 percent). Unregulated nonbank intermediaries reach about 6-8 percent of individual entrepreneurs with a demand for loans.

Individual entrepreneurs receiving informal loans present the following features. Individual entrepreneurs receiving informal loans have previous experience as salaried workers, do not have formal savings, have trade credit transactions, sell their goods on credit, and reside in the South & Southeast and Center-west

[33] In the case of registered enterprises the category of informal lenders includes mainly partners and shareholders.

regions. However, we observed two main differences between farmers and microentrepreneurs that receive informal loans: (a) formal education increases the use of informal loans for microentrepreneurs but decreases it use for farmers; and (b) microentrepreneurs experiencing adverse shocks are more likely to receive informal loans, but for farmers their access to informal is not affected by experiencing an adverse shock.

In terms of receiving formal loans, we find that size indicators, such as assets and number of workers, as well as education attainment are not statistically significant; however registration with government agencies increases the use of formal loans, suggesting complementarities in participation. Farmers that are nonindigenous, receive training, use trade credit, are members of guilds, receive PROCAMPO benefits, and have irrigated land have better access to formal loans. Microentrepreneurs that have been less time in operations and have formal or informal savings are more likely to borrow from formal lenders. We observe regional differences in access to formal lenders only for microentrepreneurs; however farmers in urban areas (more than 50,000 inhabitants) have less access. Another interesting finding is that the presence of financial providers in the municipality increases the use of formal loans. This suggests that physical proximity may be a factor affecting the ability of entrepreneurs to interact with formal lenders, reducing transaction costs. When examining how entrepreneurs interact with formal lenders we find that it is mostly through visits.

The profile of individual entrepreneurs demanding formal loans is broadly similar to those demanding informal loans, suggesting that the demand for loans is not tied to a specific provider. Microentrepreneurs more likely to demand loans have worked as salaried employee, are middle-aged, have formal education, have formal savings, buy inputs on credit, receive remittances (informal loans only), and were affected by adverse events. Farmers with a higher probability of demanding loans have worked as a salaried employee, receive remittances, have households with more people (informal loans only), use coyotes to sell their products, sell outside the municipality, have formal savings (informal loans only), made sales on credit, buy inputs on credit, and were affected by adverse events. Individual entrepreneurs located in more populated and more agrarian municipalities tend to demand more loans. Lastly, we observe regional differences in the demand for loans.

Overall, credit-constrained individual entrepreneurs present similar features to those demanding loans. Farmers more likely to be credit constrained worked as a salaried employee (formal loans only), receive remittances, have bigger families (informal loans only), sell their goods through coyotes, sell outside the municipality, have irrigated land, do not have formal savings (informal loans only), made sales on credit (formal loans only), were affected by adverse shocks, and plan to improve their business (formal loans only). Microentrepreneurs with a greater propensity to be credit constrained are female (informal loans only), worked as a salaried employee (formal loans only), are middle-aged (formal loans only), have formal education (formal loans only), do not have formal savings, made sales on credit, and were affected by adverse events. Consistent with the literature, we find a significant wealth effect. For example, individual entrepreneurs with more assets and with formal savings (financial wealth) are less likely to be credit constrained.

Enterprises that have more assets, have been longer in operations, and have exporting experience are more likely to receive loans. Enterprises more likely to borrow from formal lenders have more assets, have been longer in operations, export their production, sell on credit, buy on credit, have formal savings, are not registered with government agencies, use the Internet for their operations, plan to improve their business, operated in the agricultural sector, and report problems in their operations. Enterprises with better access to informal lenders have managers without college education, have more employees, are older, are member of economic groups, buy on credit, have formal savings, do not use external auditors, are not registered with government agencies, and are members of private organizations (guilds). We find

some regional differences in access to formal and informal loans. Enterprises in the South & Southeast, Center, and Northwest regions are more likely to receive informal loans, but they are less likely to borrow from formal lenders. Agricultural enterprises in urban areas (more than 50,000 inhabitants) have less access to formal lenders.

Overall, the profile of enterprises' demand for formal and informal loans is associated with the same characteristics. Enterprises demanding loans have less educated managers, export part of their production, are not registered with government authorities, buy inputs on credit, and report some problems in their operations. In addition to those variables, enterprises demanding formal loans have the main shareholder responsible for their operations, and operate in the agricultural sector. Whereas, enterprises demanding informal loans are older, do not have external auditors, do not train their workers, and are registered with private organizations. Enterprises located in the South & Southeast region are more likely to demand loans, but agricultural enterprises located in urban areas present lower chances of demanding loans.

Enterprises more likely to be credit constrained: are smaller, are younger, do not have formal savings, are not members of economic groups, are located in states with less population working in agriculture. Furthermore, we find that enterprises located in the South & Southeast region have a higher probability of being credit constrained from formal lenders. Enterprises located in the Center, Center-west, and Northwest regions as well as agricultural enterprises placed in urban areas are less likely to be credit constrained from informal lenders. A surprising finding is that enterprises with foreign ownership and with a more concentrated ownership are more likely to be credit constrained from formal lenders.

The paper answers two key questions regarding the consequences of credit constraints on investment, namely: Does the incidence of credit constraints reduce the number of economic agents making investments? And if so, how many more agents would invest and how much larger would their investment be in the absence of credit constraints? We present empirical evidence that credit constraints influence negatively the investment behavior of individual entrepreneurs and enterprises. This effect is particularly negative for individual entrepreneurs. This situation should be a matter of concern for policymakers that want to promote growth in Mexico's rural economy. Investments are defined as expenditures to acquire capital goods, including buildings, equipment, tools, machinery, vehicles, and other capital assets. A separate analysis is carried out for the purchase of agricultural land.

Individual entrepreneurs are less likely to make investments than enterprises. About 37 percent of microentrepreneurs made some type of investment during the period covered by the survey, relatively higher than the 27 percent of farmers that invested. In contrast, about 78-80 percent of enterprises made investments. This reflects that individual entrepreneurs are more likely to be credit constrained and that farmers are more credit constrained than microentrepreneurs (see section 6 above). Only 4 percent of farmers purchased agricultural land, indicating that land markets are not very active in the rural economy. The actual amounts invested were small relative to the total business assets of individual entrepreneurs and enterprises (I/K ratio). The median value of I/K is about 10-13 percent for individual entrepreneurs and slightly higher for enterprises (15-17 percent). In the case of land purchases made by farmers, the I/K ratio is substantially higher, reaching 48 percent. This could be because newly purchased land has a higher value than existing land holdings.[34]

Economic agents more likely to invest and to have higher I/K ratio present the following features: *For individual entrepreneurs*: worked as salaried employee, have more assets, hire workers, are younger, have formal savings (farmers only), have informal savings, have improved economic conditions in their

[34] Please note that most farmers operate in ejidal or communal land.

households, plan to improve their businesses (microentrepreneurs only), do not operate in commerce (microentrepreneurs only), receive PROCAMPO transfers (farmers only), receive remittances (microentrepreneurs only), and are located in more agrarian municipalities. Microentrepreneurs with younger operations invest more but farmers with older operations invest more. Farmers that invested in land have formal and informal deposits/savings, improved the economic conditions of their households, and have younger operations. *For enterprises*: have higher values of lagged I/K, stronger sales growth, and have more assets. Agricultural and manufacturing enterprises have lower I/K ratios.

The low use of loans has consequences for the amount of investment that occurs in the rural economy, posing a major obstacle to Mexico's convergence toward its NAFTA partners. The empirical analysis, which includes proxies of business prospects and creditworthiness, shows that removing credit constraints would have its largest effect on the number of individual entrepreneurs that invest and on the I/K level of enterprises. From a policy perspective, the trick is to increase the level of prudent lending for a given level of risk-adjusted interest rate and per capita income. Had there been no credit constraints during the period covered by the surveys, the percentage of microentrepreneurs and farmers making investments would have been about 31 and 35 percent higher, respectively. The estimated effects on the I/K are smaller: 10 percent for microentrepreneurs and about 8 percent for farmers. In the case of enterprises, the estimated effects are more modest as the incidence of credit constraints is lower than for individual entrepreneurs. Removing credit constraints for enterprises would result in 3-9 percent increase in the number of enterprises investing and in 4-19 percent higher I/K ratio.

References

Beck, Thorsten, Asli Demirgüç-Kunt, and Vojislav Maksimovic (2002), "Financial and Legal Constraints to Firm Growth: Does Size Matter?" Policy Research Working Paper No. 2784, World Bank, Washington, D.C.

Bigsten, A., P. Collier, S. Dercon, M. Fafchamps, B. Gauthier, J.W. Gunning, M. Soderbom, A. Oduro, R. Oostendorp, C. Patillo, F. Teal, and A. Zeufack, (2003), "Credit Constraints in Manufacturing Enterprises in Africa," *Journal of African Economies*, 12 (1), 104-125.

Bond, S., J. Elston, J. Mairesse, and B. Mulkay, (1997), "Financial Factors and Investment in Belgium, France, Germany and the UK: A Comparison Using Company Panel Data," Working Paper No. 5900, National Bureau of Economic Research, Cambridge, Massachusetts.

Castaneda, Gonzalo (2002), "Internal Capital Markets and Financing Choices of Mexican Firms Before and During the Financial Paralysis of 1995-2000," In Arturo Galindo and Fabio Schiantarelli, eds, *Determinants and Consequences of Financial Constraints Facing Firms in Latin America*, manuscript, Inter-American Development Bank.

Cuevas, Alfredo, Miguel Messmacher, and Alejandro Werner (2002), "Changes in the Patterns of External Financing in Mexico since the Approval of NAFTA," Prepared for the World Bank, study on Deepening NAFTA, World Bank, Washington, D.C.

Demirguc-Kunt, Asli, and Vojislav Maksimovic (1998), "Law, Finance and Firm Growth," *Journal of Finance*, 53 (6), 2107-31.

Fazzari, S., G. Hubbard, and B. Peterson (1988), "Financing Constraints and Corporate Investment," *Brookings Papers on Economic Activity*, 78 (2), 141-95.

Gelos, Gaston, and Alejandro Werner (1999), "Financial Liberalization, Credit Constraints, and Collateral: Investment in the Mexican Manufacturing Sector," Working Paper No. 99/25, International Monetary Fund, Washington, D.C.

Hubbard, R. Glenn, and Anil Kashyap (1992), "Internal Net Worth and the Investment Process: An Application to US Agriculture," *Journal of Political Economy*, 100 (3), 506-34.

INEGI – Instituto Nacional Estadística Geografía e Informática (2002), "Household and Enterprise Survey Design," manuscipt, INEGI, Aguascalientes, Mexico.

Iscan, Talan (1998), "Financing Constraints and Investment Decline in Mexico," Working Paper, Department of Economics, Dalhousie University, Nova Scotia, Canada.

Jaffee, and Stiglitz (1990), "Credit Rationing," *Handbook of Monetary Economics*, II, Edited by Friedman and Hahn, Elsevier Science Publishers.

Key, Niguel (1997), "Modeling and Estimating Agricultural Household Behavior under Imperfect Markets," manuscript, Department of Economics, University of California Berkeley.

Love, Inessa (2003), "Financial Development and Financing Constraints: International Evidence from the Structural Investment Model," *Review of Financial Studies*, 16 (3), 765-791.

Maloney, William, and Pablo Fajnzylber (2002), "Microenterprises: Razón de Ser and Dynamics," manuscript, World Bank, Washington D.C.

Sánchez, Oscar (2001), "Investment by Manufacturing Firms and the Transmission of Monetary Policy in Mexico," Working Paper No. 111, Center for Research on Economic Development and Policy Reform, Stanford University, California.

Schrieder, Mark (1996), “Discrimination in Installment Lending by Retailers of Consumer Durables in Apartheid South Africa,” unpublished manuscript.

Stanton, Julie (1994), “Determinants of the Supply of Rural Credit in Mexico: Evidence of Quantity Rationing and Links Between Credit Access and Farm Characteristics,” manuscript, University of Maryland.

Tan, Hong, and Gladys Lopez-Acevedo (2003), “Mexico: In-firm training for the knowledge economy,” Policy Research Paper No. 2957, World Bank, Washington, D.C.

World Bank (1995), “Mexico: Rural Financial Markets,” Report No. 14599-MX, Natural Resources and Rural Poverty Division, Country Department II, Latin America and the Caribbean Regional Office, The World Bank, Washington, D.C.

World Bank (2002), Project Appraisal Document, “Savings and Credit Sector Strengthening and Rural Microfinance Capacity Building: Technical Assistance Project,” Report No. 23868-ME, Latin America and Caribbean Region, Colombia, Mexico, and Venezuela Country Management Unit, Environmentally and Socially Sustainable Development Sector Management Unit, The World Bank, Washington, D.C.

Table 1: Household and enterprise surveys: sample characteristics and results

(number of observations)	*Total*	*Region 1 Southeast*	*Region 2 Center*	*Region 3 Center-west*	*Region 4 Northwest*	*Region 5 Northeast*
Panel A. Household survey						
Microenterprises	3,301	966	912	662	396	365
Farmers	1,825	601	598	384	113	129
Panel B. Enterprise survey						
Agricultural enterprises	*954*	*163*	*259*	*189*	*165*	*178*
< 2,500 inhabitants	75	35	0	10	23	7
2,500 - 50,000 inhabitants	261	67	56	49	51	38
> 50,000 inhabitants	618	61	203	130	91	133
Nonagricultural enterprises	*1,073*	*171*	*391*	*242*	*114*	*155*
< 2,500 inhabitants	334	38	95	111	32	58
2,500 - 50,000 inhabitants	739	133	296	131	82	97
Agricultural enterprises	17,226	2,935	4,472	4,917	2,211	2,691
< 2,500 inhabitants	75	35	0	10	23	7
2,500 - 50,000 inhabitants	5,193	1,530	987	1,512	732	432
> 50,000 inhabitants	11,958	1,370	3,485	3,395	1,456	2,252
Nonagricultural enterprises	30,209	8,242	7,715	8,492	2,710	3,050
< 2,500 inhabitants	343	38	95	111	35	64
2,500 - 50,000 inhabitants	29,866	8,204	7,620	8,381	2,675	2,986

Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 2: Classification of lenders

Formal lenders	*Informal lenders*
Private banks	Moneylenders
Development banks (first-tier)	Friends and relatives
Regulated nonbanks	Input supplier
Investment houses (SOFOLES)	Clients
Factoring companies	Partners and/or shareholders (enterprises only
Leasing companies	Other informal providers
Savings and credit institutions	
Credit unions (UCs)	
Savings and loan societies (SAPs)	
Unregulated nonbanks	
Savings and credit institutions	
Credit cooperatives	
Civil associations	
Cajas de ahorro	
Government programs	
Other institutions	

Table 3a: Participation in loan markets

Type of lender	*No demand*	*Credit constrained*	*Received*	*Total*
Microentrepreneurs				
All loans	47.1	36.8	16.1	100.0
Formal loans	52.7	42.0	5.2	100.0
Informal loans	52.9	35.4	11.6	100.0
Farmers				
All loans	43.4	41.2	15.4	100.0
Formal loans	46.6	47.5	5.9	100.0
Informal loans	50.0	40.3	9.8	100.0
Nonagricultural enterprises				
All loans	51.0	18.7	30.3	100.0
Formal loans	55.8	23.3	20.9	100.0
Informal loans	62.8	24.4	12.8	100.0
Agricultural enterprises				
All loans	39.4	21.4	39.2	100.0
Formal loans	44.9	26.5	28.6	100.0
Informal loans	55.9	29.6	14.6	100.0

Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 3b: Participation in loan markets

Type of lender	Nonborrowers				Borrowers		
	(1) No Demand (a)	(2) Demand but not (a)	(3) Applied and rejected (a)	(b)	(4) Received: (a)	(4a) Full amount (c)	(4b) Partial amount (c)
Panel A. Microentrepreneurs							
All loans	47.1	35.9	0.9	5.0	16.1	91.7	3.4
Formal loans	52.7	41.2	0.9	14.3	5.2	87.5	6.5
Commercial banks	58.2	40.6	0.4	33.3	0.8	87.5	4.2
Development banks	57.2	42.4	0.1	15.4	0.3	63.6	9.1
Regulated nonbanks	56.6	41.7	0.2	11.3	1.5	46.8	4.3
Unregulated nonbanks	56.4	39.8	0.3	7.4	3.5	87.5	6.3
Informal loans	52.9	35.3	0.2	1.6	11.6	93.3	1.9
Friends and relatives	60.7	29.0	0.1	0.9	10.2	91.7	2.1
Other informal lenders	58.3	39.7	0.1	4.6	2.0	90.3	0.0
Panel B. Farmers							
All loans	43.4	40.3	0.9	5.7	15.4	92.2	3.6
Formal loans	46.6	46.3	1.2	16.3	5.9	87.0	7.4
Commercial banks	53.5	45.3	0.4	33.3	0.8	78.6	0.0
Development banks	51.5	46.4	0.4	20.0	1.8	78.1	9.4
Regulated nonbanks	51.8	47.3	0.2	18.8	0.7	76.9	3.4
Unregulated nonbanks	51.0	45.5	0.4	12.3	3.1	89.5	3.4
Informal loans	50.0	40.2	0.1	1.1	9.8	94.9	1.1
Friends and relatives	59.5	32.2	0.1	0.7	8.3	92.1	3.4
Other informal lenders	53.1	45.1	0.1	3.0	1.8	96.9	0.0
Panel C. Nonagricultural enterprises							
All loans	51.0	17.3	1.4	4.4	30.3	94.8	4.0
Formal	55.8	21.5	1.8	7.8	20.9	92.0	5.4
Commercial banks	62.7	19.2	1.9	10.3	16.2	90.8	6.3
Development banks	66.4	29.5	0.4	8.9	3.8	85.4	7.3
Regulated nonbanks	66.8	30.8	0.0	0.0	2.3	100.0	0.0
Unregulated nonbanks	66.9	32.2	0.2	22.2	0.7	100.0	0.0
Informal	62.8	24.4	0.0	0.0	12.8	95.6	0.7
Partners or shareholders	66.1	25.3	0.0	0.0	8.6	94.6	0.0
Other informal lenders	67.6	27.7	0.0	0.0	4.8	94.1	2.0
Panel D. Agricultural enterprises							
All loans	39.4	19.9	1.5	3.6	39.2	94.1	4.5
Formal	44.9	24.6	1.9	6.2	28.6	91.9	5.5
Commercial banks	52.2	24.9	0.8	3.7	22.0	92.9	4.3
Development banks	58.7	35.6	0.7	13.0	4.9	91.5	6.4
Regulated nonbanks	60.4	38.1	0.0	0.0	1.6	93.3	0.0
Unregulated nonbanks	59.9	36.7	0.6	18.2	2.8	74.1	11.1
Informal	55.9	29.5	0.1	0.7	14.6	95.0	1.4
Partners or shareholders	61.8	32.9	0.0	0.0	5.2	92.0	0.0
Other informal lenders	59.0	30.8	0.1	1.0	10.1	94.8	2.1

a. Percent of total number of observations.
b. Percent of total number of loan applicants.
c. Percent of total number of borrowers.
Note: Because of missing values the sum of columns (4a) and (4b) may not add to 100.
Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 3c: Market penetration by type of lender

Type of lender	*Microentrepreneurs*	*Farmers*	*Nonagricultural enterprises*	*Agricultural enterprises*
Private banks	1.8	1.7	43.5	46.1
Development banks	0.8	3.6	11.4	11.9
Regulated nonbanks	3.4	1.5	7.0	4.0
Unregulated nonbank	8.1	6.4	2.0	7.0
Friends & relatives	26.1	20.4	n.a.	n.a.
Shareholders	n.a.	n.a.	25.3	13.7
Other informal lender	4.7	3.7	14.7	24.6

n.a.: not applicable.

Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 4: Reasons for being credit constrained

(Percent)	*Individual entrepreneurs*			*Enterprises*		
	Total	*Micro entrepreneur*	*Farmers*	*Total*	*Non-agricultural*	*Agricultural*
			Panel A. Any loan			
Credit constrained agent	38.4	36.8	41.2	20.0	18.7	21.4
Reasons for being credit constrained a/						
Rejected	2.3	2.3	2.3	7.2	7.5	6.9
Did not request loans bcse of:						
Doesn't know how to apply	26.7	25.8	28.3	18.1	18.3	17.9
Think it will be rejected	25.2	25.9	24.1	22.1	16.1	27.9
Inadequate amounts and maturity	41.5	42.1	40.6	9.3	9.1	9.5
High interest rates and fees	1.5	1.3	1.9	23.1	23.7	22.6
High transactions costs	34.5	33.2	36.7	18.9	15.1	22.6
Too risky	15.8	14.9	17.1	9.3	5.4	13.2
Other reasons	8.0	8.6	7.0	38.6	44.1	33.2
			Panel B. Formal loans			
Credit constrained	44.0	42.1	47.5	24.8	23.3	26.5
Reasons for being credit constrained a/						
Rejected	2.2	2.1	2.4	7.4	7.6	7.1
Did not request loans bcse of:						
Doesn't know how to apply	25.8	25.1	27.0	17.2	16.9	17.4
Think it will be rejected	24.8	25.7	23.4	20.0	13.9	26.0
Inadequate amounts and maturity	33.6	34.9	31.5	7.3	7.4	7.2
High interest rates and fees	0.7	0.8	0.6	21.7	22.1	21.3
High transactions costs	30.8	29.6	32.7	18.2	14.7	21.7
Too risky	11.3	10.9	11.9	7.1	4.3	9.8
Other reasons	8.4	7.8	9.4	40.6	46.3	34.9
			Panel C. Informal loans			
Credit constrained	37.2	35.4	40.3	26.8	24.4	29.6
Reasons for being credit constrained a/						
Rejected	0.4	0.5	0.3	0.2	0.0	0.4
Did not request loans bcse of:						
Doesn't know how to apply	13.5	14.0	12.6	9.9	10.3	9.6
Think it will be rejected	18.0	19.3	16.1	12.3	6.9	17.4
Inadequate amounts and maturity	36.0	36.7	35.1	4.1	4.2	3.9
High interest rates and fees	1.2	0.8	1.8	10.3	11.1	9.6
High transactions costs	16.2	15.7	17.1	5.9	5.3	6.4
Too risky	15.1	14.3	16.4	4.2	3.1	5.3
Other reasons	9.8	9.0	10.9	57.6	62.2	53.4

a. Multiple responses allowed. Percent of those being credit constrained

Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 5: Demand identification variables
(mean values of each column heading)

(Mean values of each column heading)	*Formal loans*			*Informal loans*			*Formal loans*			*Informal loans*		
	No demand	*Demand*	*T-test*	*No demand*	*Demand*	*T-test*	*No demand*	*Demand*	*T-test*	*No demand*	*Demand*	*T-test*
Panel A. Individuals	*Microenterprises*						*Farmers*					
No. observations	1701	1524		1700	1511		851	974		912	913	
Entrepreneurial abilities												
Preliminary steps (d)	0.46	0.54	***	0.46	0.54	***	0.31	0.39	***	0.31	0.39	***
Inherited a business (farm) (d)	0.13	0.13	NS	0.13	0.12	NS	0.60	0.61	NS	0.60	0.61	NS
Need for funds												
Death or illness (d)	0.06	0.10	***	0.07	0.10	***	0.07	0.10	**	0.06	0.11	***
Loss of income (d)	0.06	0.10	***	0.06	0.11	***	0.13	0.16	*	0.14	0.15	NS
Affected by adverse weather (d)	0.08	0.13	***	0.09	0.13	***	0.27	0.38	***	0.27	0.39	***
Present economic situation of the family is better (d)	0.31	0.30	NS	0.30	0.31	NS	0.22	0.20	NS	0.22	0.20	NS
Expansion prospects												
Plans to make improvements in business (d)	0.44	0.48	***	0.44	0.48	**	0.26	0.37	***	0.27	0.37	***
Did not purchase asset b/c - no need (d)	0.39	0.30	***	0.40	0.28	***	0.28	0.25	*	0.29	0.24	***
Wealth												
Purchased house with own resources (d)	0.64	0.61	**	0.65	0.60	***	0.65	0.67	NS	0.65	0.67	NS
Personal savings to start the business (d)	0.57	0.50	***	0.57	0.50	***						
Panel A. Enterprises	*Nonagricultural*						*Agricultural*					
No. observations	599	474		674	399		428	526		533	421	
Need for funds												
Clients paying late - (d)	0.19	0.22	NS	0.19	0.23	**	0.16	0.17	NS	0.18	0.15	NS
Problem: reduction in internal resources in 2001	0.19	0.26	***	0.19	0.27	***	0.22	0.32	***	0.24	0.32	***
Problem: delay in credit payments to clients in 2001	0.15	0.22	***	0.16	0.22	***	0.16	0.16	NS	0.17	0.15	NS
Expansion prospects												
Plans to make improvements in business	0.72	0.81	***	0.74	0.79	**	0.71	0.77	**	0.74	0.76	NS
No problem to commercialize	0.31	0.21	***	0.29	0.22	***	0.27	0.16	***	0.24	0.16	***
Wealth												
Finance came from own resources (>50%)	0.87	0.85	NS	0.86	0.87	NS	0.88	0.80	***	0.89	0.77	***

* significant at 10%; ** significant at 5%; *** significant at 1%
(d) dummy variable.
Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 6a: Microentrepreneurs—partial derivatives of participation outcomes in *formal* loan markets (derived from Heckman probit estimates)

	Formal						*Mean value of X*
	No Demand		*Credit constrained*		*Received*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability	0.525		0.456		0.018		
Household characteristics							
Number of people in the household	0.005	[0.248]	-0.004	[0.352]	-0.001	[0.311]	4.864
Received remittances (d)	-0.031	[0.338]	0.023	[0.452]	0.007	[0.408]	0.114
Personal characteristics							
Male (d)	0.018	[0.463]	-0.026	[0.289]	0.008	[0.120]	0.647
Speak indigenous language (d)	-0.050	[0.134]	0.033	[0.337]	0.017	[0.207]	0.118
Worked as salaried worker (d)	-0.055**	[0.013]	0.056**	[0.010]	-0.001	[0.813]	0.641
Age (years)	-0.016***	[0.002]	0.012**	[0.015]	0.003***	[0.006]	43.480
Age squared/100	0.016***	[0.003]	-0.013**	[0.017]	-0.003**	[0.013]	20.458
Primary - (d)	-0.097***	[0.004]	0.096***	[0.003]	0.001	[0.944]	0.482
Secondary - (d)	-0.064	[0.113]	0.065	[0.104]	-0.001	[0.919]	0.215
More than secondary - (d)	-0.040	[0.361]	0.048	[0.269]	-0.008	[0.359]	0.186
Business characteristics							
No workers hired in 2001 (d)	0.002	[0.941]	0.004	[0.856]	-0.006	[0.320]	0.631
Sells outside municipality (d)	0.027	[0.250]	-0.020	[0.401]	-0.008	[0.120]	0.283
Productive assets (log)	0.006	[0.174]	-0.008*	[0.087]	0.002	[0.226]	9.295
Age of business (log)	0.011	[0.324]	0.001	[0.923]	-0.012***	[0.000]	1.948
Manufacturing (d)	-0.037	[0.165]	0.014	[0.594]	0.023**	[0.011]	0.270
Commerce (d)	0.027	[0.315]	-0.029	[0.282]	0.001	[0.823]	0.367
Owner/worker received training (d)	-0.042	[0.323]	0.045	[0.284]	-0.003	[0.706]	0.066
Has formal savings (d)	-0.023	[0.482]	-0.053	[0.110]	0.076***	[0.000]	0.116
Has informal savings - tandas (d)	-0.070***	[0.005]	0.049**	[0.044]	0.021***	[0.006]	0.223
Made sales on credit (d)	0.050**	[0.046]	-0.054**	[0.029]	0.004	[0.518]	0.223
Bought inputs on credit (d)	-0.047	[0.120]	0.053*	[0.074]	-0.006	[0.236]	0.149
Registration with any govmnt - (d)	0.014	[0.560]	-0.025	[0.294]	0.011	[0.103]	0.416
Member in guilds (d)	-0.026	[0.432]	0.020	[0.537]	0.006	[0.469]	0.114
Regional characteristics							
Region 1: South & Southeast (d)	0.040	[0.308]	-0.048	[0.223]	0.007	[0.470]	0.295
Region 2: Center (d)	0.230***	[0.000]	-0.216***	[0.000]	-0.014*	[0.058]	0.296
Region 3: Center-west (d)	0.081**	[0.037]	-0.115***	[0.002]	0.034**	[0.027]	0.191
Region 4: Northwest (d)	0.183***	[0.000]	-0.179***	[0.000]	-0.003	[0.707]	0.120
Population in municipality (log)	0.018*	[0.076]	-0.020**	[0.042]	0.002	[0.413]	10.554
Population employed in agricultural sector in municipality (%)	0.160**	[0.011]	-0.146**	[0.019]	-0.014	[0.422]	0.234
Number of types of providers of financial services in locality	0.000	[0.986]	-0.003	[0.594]	0.003**	[0.020]	2.267
Demand identification							
Preliminary steps to start a business - (d)	-0.029	[0.167]	0.026	[0.172]	0.002	[0.254]	0.500
Death or illness - (d)	-0.107***	[0.005]	0.098***	[0.002]	0.009	[0.321]	0.085
Loss of income - (d)	-0.091**	[0.030]	0.084**	[0.043]	0.008	[0.119]	0.078
Purchased house with own resources (d)	0.017	[0.415]	-0.015	[0.416]	-0.001	[0.455]	0.629
Inherited a business (d)	-0.002	[0.949]	0.002	[0.949]	0.000	[0.949]	0.133
Present economic situation of the family is better -	0.019	[0.388]	-0.017	[0.387]	-0.001	[0.461]	0.299
Did not purchase asset b/c of no need - (d)	0.078***	[0.000]	-0.072***	[0.001]	-0.006*	[0.078]	0.345
Plans to make improvements in business - (d)	-0.010	[0.610]	0.010	[0.608]	0.001	[0.649]	0.461
Affected by climatic events (d)	-0.075**	[0.022]	0.069**	[0.020]	0.006	[0.283]	0.106

Robust p values in brackets.
Number of observations: 2,817.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 6b: Microentrepreneurs—partial derivatives of participation outcomes in *informal* loan markets (derived from Heckman probit estimates)

	Informal						*Mean value of X*
	No Demand		*Credit constrained*		*Received*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability	0.534		0.393		0.072		
Household characteristics							
Number of people in the household	0.004	[0.360]	-0.004	[0.424]	-0.001	[0.825]	4.864
Received remittances (d)	-0.062**	[0.047]	0.009	[0.762]	0.053**	[0.011]	0.114
Personal characteristics							
Male (d)	0.037	[0.141]	-0.048**	[0.048]	0.011	[0.391]	0.647
Speak indigenous language (d)	-0.024	[0.475]	0.036	[0.279]	-0.012	[0.495]	0.118
Worked as salaried worker (d)	-0.056**	[0.011]	0.031	[0.153]	0.025**	[0.040]	0.641
Age (years)	-0.011**	[0.027]	0.003	[0.556]	0.008***	[0.005]	43.480
Age squared/100	0.012**	[0.025]	-0.001	[0.861]	-0.011***	[0.001]	20.458
Primary - (d)	-0.091***	[0.006]	0.034	[0.338]	0.057**	[0.010]	0.482
Secondary - (d)	-0.059	[0.139]	0.000	[0.998]	0.059**	[0.045]	0.215
More than secondary - (d)	-0.080*	[0.065]	0.000	[0.994]	0.079**	[0.017]	0.186
Business characteristics							
No workers hired in 2001 (d)	0.003	[0.874]	-0.004	[0.838]	0.001	[0.944]	0.631
Sells outside municipality (d)	0.002	[0.929]	-0.009	[0.708]	0.006	[0.618]	0.283
Productive assets (log)	0.002	[0.739]	-0.004	[0.398]	0.002	[0.429]	9.295
Age of business (log)	0.004	[0.685]	0.006	[0.530]	-0.011*	[0.075]	1.948
Manufacturing (d)	-0.023	[0.394]	0.005	[0.853]	0.018	[0.235]	0.270
Commerce (d)	0.018	[0.496]	-0.019	[0.461]	0.001	[0.938]	0.367
Owner/worker received training (d)	-0.066	[0.123]	0.052	[0.209]	0.014	[0.567]	0.066
Has formal savings (d)	0.095***	[0.004]	-0.046	[0.141]	-0.049***	[0.000]	0.116
Has informal savings - tandas (d)	-0.061**	[0.014]	0.010	[0.660]	0.050***	[0.001]	0.223
Made sales on credit (d)	0.026	[0.300]	-0.068***	[0.004]	0.042***	[0.009]	0.223
Bought inputs on credit (d)	-0.118***	[0.000]	0.029	[0.346]	0.090***	[0.000]	0.149
Registration with any govmnt - (d)	0.035	[0.144]	-0.025	[0.278]	-0.010	[0.467]	0.416
Member in guilds (d)	-0.019	[0.564]	0.008	[0.798]	0.011	[0.564]	0.114
Regional characteristics							
Region 1: South & Southeast (d)	-0.003	[0.931]	-0.052	[0.181]	0.056**	[0.040]	0.295
Region 2: Center (d)	0.187***	[0.000]	-0.217***	[0.000]	0.029	[0.220]	0.296
Region 3: Center-west (d)	0.087**	[0.026]	-0.146***	[0.000]	0.059**	[0.037]	0.191
Region 4: Northwest (d)	0.154***	[0.000]	-0.176***	[0.000]	0.023	[0.402]	0.120
Population in municipality (log)	0.005	[0.620]	-0.016	[0.108]	0.011**	[0.043]	10.554
Population employed in agricultural sector in municipality (%)	0.158**	[0.011]	-0.238***	[0.000]	0.080**	[0.029]	0.234
Number of types of providers of financial services in locality	0.009	[0.125]	-0.007	[0.182]	-0.001	[0.693]	2.267
Demand identification							
Preliminary steps to start a business - (d)	-0.031*	[0.086]	0.016*	[0.080]	0.015	[0.167]	0.500
Death or illness - (d)	-0.088***	[0.004]	0.039*	[0.052]	0.050**	[0.036]	0.085
Loss of income - (d)	-0.126***	[0.000]	0.051*	[0.091]	0.075***	[0.002]	0.078
Purchased house with own resources (d)	0.023	[0.217]	-0.011	[0.290]	-0.011	[0.194]	0.629
Inherited a business (d)	0.006	[0.827]	-0.003	[0.829]	-0.003	[0.826]	0.133
Present economic situation of the family is better -	-0.003	[0.857]	0.002	[0.855]	0.002	[0.860]	0.299
Did not purchase asset b/c of no need - (d)	0.101***	[0.000]	-0.054**	[0.011]	-0.047***	[0.000]	0.345
Plans to make improvements in business - (d)	0.011	[0.557]	-0.005	[0.581]	-0.005	[0.542]	0.461
Affected by climatic events (d)	-0.029	[0.318]	0.014	[0.355]	0.015	[0.323]	0.106

Robust p values in brackets.
Number of observations: 2,817.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 6c: Farmers—partial derivatives of participation outcomes in *formal* loan markets (derived from Heckman probit estimates)

	Formal						*Mean value of X*
	No Demand		*Credit constrained*		*Received*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability	0.448		0.526		0.025		
Household characteristics							
Number of people in the household	-0.007	[0.194]	0.006	[0.301]	0.001	[0.328]	5.087
Received remittances (d)	-0.057	[0.141]	0.067*	[0.081]	-0.010	[0.249]	0.137
Received PROCAMPO transfers (d)	-0.034	[0.263]	0.015	[0.617]	0.019**	[0.048]	0.350
Personal characteristics							
Speak indigenous language (d)	-0.006	[0.883]	0.031	[0.431]	-0.025***	[0.003]	0.221
Worked as salaried worker (d)	-0.078***	[0.006]	0.071**	[0.012]	0.006	[0.416]	0.580
Age (years)	-0.007	[0.335]	0.006	[0.345]	0.000	[0.973]	52.012
Age squared/100	0.004	[0.545]	-0.004	[0.549]	0.000	[0.996]	28.993
Primary - (d)	-0.006	[0.864]	0.015	[0.668]	-0.009	[0.391]	0.564
Secondary - (d)	0.040	[0.457]	-0.029	[0.577]	-0.010	[0.342]	0.126
More than secondary - (d)	0.038	[0.563]	-0.038	[0.558]	0.000	[0.996]	0.073
Business characteristics							
Certified or genetically improved seeds (d)	0.027	[0.524]	-0.051	[0.209]	0.025*	[0.095]	0.151
Livestock production (d)	-0.034	[0.295]	0.058*	[0.078]	-0.023**	[0.016]	0.424
Agricultural or livestock subproducts (d)	0.075**	[0.014]	-0.069**	[0.024]	-0.006	[0.456]	0.413
No workers hired in 2001 (d)	-0.013	[0.645]	0.012	[0.690]	0.002	[0.843]	0.326
Sells to informal trader (coyote) (d)	-0.073**	[0.023]	0.079**	[0.013]	-0.006	[0.442]	0.241
Sells outside municipality (d)	-0.124***	[0.001]	0.124***	[0.001]	0.000	[0.972]	0.151
Owns ejido/communal land (d)	-0.025	[0.410]	0.021	[0.482]	0.004	[0.640]	0.517
Owns irrigated land (d)	-0.115***	[0.001]	0.098***	[0.005]	0.017	[0.128]	0.222
Productive assets (log)	0.010	[0.154]	-0.011	[0.116]	0.001	[0.640]	9.316
Age of business (log)	0.023	[0.245]	-0.028	[0.157]	0.005	[0.405]	2.920
Received training or technical assistance (d)	0.014	[0.706]	-0.037	[0.305]	0.023*	[0.062]	0.223
Has formal savings (d)	0.039	[0.497]	-0.063	[0.249]	0.024	[0.235]	0.078
Has informal savings - tandas (d)	-0.026	[0.658]	0.028	[0.632]	-0.002	[0.890]	0.056
Made sales on credit (d)	-0.126**	[0.011]	0.120**	[0.013]	0.005	[0.682]	0.080
Bought inputs on credit (d)	-0.071	[0.141]	0.018	[0.705]	0.053**	[0.019]	0.099
Registration with any govmnt - (d)	-0.009	[0.831]	-0.034	[0.411]	0.043**	[0.024]	0.155
Member in guilds (d)	-0.025	[0.612]	-0.004	[0.938]	0.028	[0.111]	0.114
Regional characteristics							
Region 1: South & Southeast (d)	-0.023	[0.742]	0.017	[0.809]	0.006	[0.731]	0.324
Region 2: Center (d)	0.180***	[0.007]	-0.178***	[0.007]	-0.002	[0.878]	0.346
Region 3: Center-west (d)	0.049	[0.483]	-0.072	[0.287]	0.024	[0.293]	0.200
Region 4: Northwest (d)	0.020	[0.807]	-0.022	[0.786]	0.002	[0.934]	0.069
Population in municipality (log)	0.032**	[0.041]	-0.032**	[0.041]	0.000	[0.991]	10.448
Population employed in agricultural sector in municipality (%)	0.341***	[0.000]	-0.356***	[0.000]	0.016	[0.591]	0.310
Number of types of providers of financial services in locality	0.005	[0.545]	-0.010	[0.233]	0.005**	[0.018]	1.986
Urban area (d)	-0.053	[0.326]	0.066	[0.214]	-0.014	[0.108]	0.107
Demand identification							
Preliminary steps to start a business - (d)	-0.053*	[0.067]	0.052*	[0.068]	0.001	[0.458]	0.366
Death or illness - (d)	-0.045	[0.362]	0.044	[0.358]	0.001	[0.596]	0.088
Loss of income - (d)	0.020	[0.655]	-0.019	[0.657]	-0.001	[0.635]	0.134
Purchased house with own resources (d)	-0.022	[0.438]	0.021	[0.440]	0.001	[0.549]	0.645
Inherited a business (farm) (d)	-0.034	[0.246]	0.033	[0.243]	0.001	[0.539]	0.600
Present economic situation of the family is bett	0.043	[0.217]	-0.042	[0.222]	-0.001	[0.414]	0.212
Did not purchase asset b/c of no need - (d)	0.008	[0.809]	-0.007	[0.809]	0.000	[0.821]	0.252
Plans to make improvements in business - (d)	-0.086***	[0.004]	0.083***	[0.004]	0.002	[0.444]	0.331
Affected by climatic events (d)	-0.103***	[0.000]	0.100***	[0.001]	0.003	[0.415]	0.352

Robust p values in brackets.
Number of observations: 1,558.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 6d: Farmers—partial derivatives of participation outcomes in *informal* loan markets (derived from Heckman probit estimates)

	Informal						*Mean value of X*
	No demand		*Credit constrained*		*Received*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability	0.486		0.447		0.067		
Household characteristics							
Number of people in the household	-0.010*	[0.066]	0.011**	[0.045]	-0.001	[0.667]	5.087
Received remittances (d)	-0.088**	[0.021]	0.095**	[0.015]	-0.006	[0.748]	0.137
Received PROCAMPO transfers (d)	0.017	[0.585]	-0.021	[0.479]	0.004	[0.783]	0.350
Personal characteristics							
Speak indigenous language (d)	-0.033	[0.411]	0.021	[0.603]	0.012	[0.572]	0.221
Worked as salaried worker (d)	-0.083***	[0.004]	0.037	[0.183]	0.046***	[0.001]	0.580
Age (years)	-0.009	[0.216]	0.007	[0.297]	0.001	[0.675]	52.012
Age squared/100	0.006	[0.361]	-0.003	[0.658]	-0.003	[0.358]	28.993
Primary - (d)	-0.033	[0.338]	0.067**	[0.045]	-0.034*	[0.082]	0.564
Secondary - (d)	-0.035	[0.509]	0.077	[0.133]	-0.042**	[0.016]	0.126
More than secondary - (d)	-0.007	[0.917]	0.064	[0.319]	-0.057***	[0.000]	0.073
Business characteristics							
Certified or genetically improved seeds (d)	0.011	[0.791]	-0.041	[0.299]	0.031	[0.227]	0.151
Livestock production (d)	-0.036	[0.283]	0.044	[0.186]	-0.008	[0.589]	0.424
Agricultural or livestock subproducts (d)	0.068**	[0.027]	-0.063**	[0.041]	-0.006	[0.708]	0.413
No workers hired in 2001 (d)	-0.032	[0.279]	0.021	[0.469]	0.011	[0.467]	0.326
Sells to informal trader (coyote) (d)	-0.116***	[0.000]	0.087***	[0.006]	0.029	[0.124]	0.241
Sells outside municipality (d)	-0.108***	[0.004]	0.109***	[0.005]	-0.001	[0.948]	0.151
Owns ejido/communal land (d)	0.003	[0.922]	-0.005	[0.879]	0.002	[0.918]	0.517
Owns irrigated land (d)	-0.066*	[0.068]	0.084**	[0.017]	-0.018	[0.294]	0.222
Productive assets (log)	0.005	[0.466]	-0.014**	[0.047]	0.009**	[0.021]	9.316
Age of business (log)	0.013	[0.539]	-0.004	[0.849]	-0.009	[0.380]	2.920
Received training or technical assistance (d)	0.006	[0.878]	-0.007	[0.836]	0.002	[0.918]	0.223
Has formal savings (d)	0.141**	[0.010]	-0.103*	[0.057]	-0.038*	[0.064]	0.078
Has informal savings - tandas (d)	-0.092	[0.104]	0.057	[0.310]	0.035	[0.279]	0.056
Made sales on credit (d)	-0.117**	[0.021]	0.056	[0.280]	0.061*	[0.082]	0.080
Bought inputs on credit (d)	-0.122**	[0.011]	0.047	[0.341]	0.075**	[0.022]	0.099
Registration with any govmnt - (d)	0.043	[0.294]	-0.052	[0.191]	0.009	[0.657]	0.155
Member in guilds (d)	0.030	[0.545]	-0.030	[0.520]	0.000	[0.994]	0.114
Regional characteristics							
Region 1: South & Southeast (d)	-0.094	[0.178]	-0.109	[0.169]	0.203***	[0.001]	0.324
Region 2: Center (d)	0.107	[0.107]	-0.237***	[0.001]	0.130**	[0.011]	0.346
Region 3: Center-west (d)	-0.001	[0.991]	-0.245***	[0.000]	0.246***	[0.000]	0.200
Region 4: Northwest (d)	-0.040	[0.625]	-0.204**	[0.031]	0.244***	[0.007]	0.069
Population in municipality (log)	0.028*	[0.083]	-0.053***	[0.001]	0.025***	[0.001]	10.448
Population employed in agricultural sector in municipality (%)	0.370***	[0.000]	-0.494***	[0.000]	0.124**	[0.014]	0.310
Number of types of providers of financial services in locality	0.025***	[0.004]	-0.016*	[0.066]	-0.009**	[0.030]	1.986
Urban area (d)	-0.108**	[0.043]	0.061	[0.277]	0.047	[0.179]	0.107
Demand identification							
Preliminary steps to start a business - (d)	-0.084***	[0.009]	0.069***	[0.007]	0.015	[0.529]	0.366
Death or illness - (d)	-0.106	[0.273]	0.086*	[0.099]	0.020	[0.679]	0.088
Loss of income - (d)	0.028	[0.516]	-0.023	[0.532]	-0.005	[0.594]	0.134
Purchased house with own resources (d)	-0.013	[0.687]	0.010	[0.703]	0.002	[0.652]	0.645
Inherited a business (farm) (d)	-0.041	[0.186]	0.034	[0.270]	0.007	[0.418]	0.600
Present economic situation of the family is bett	0.048	[0.213]	-0.039	[0.162]	-0.008	[0.578]	0.212
Did not purchase asset b/c of no need - (d)	0.031	[0.364]	-0.025	[0.330]	-0.005	[0.616]	0.252
Plans to make improvements in business - (d)	-0.068	[0.201]	0.055	[0.340]	0.012	[0.232]	0.331
Affected by climatic events (d)	-0.121***	[0.007]	0.099	[0.120]	0.022	[0.383]	0.352

Robust p values in brackets.
Number of observations: 1,558.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 6e: Enterprises—partial derivatives of participation outcomes in *formal* loan markets (derived from Heckman probit estimates)

	Formal						*Mean value of X*
	No demand		*Credit constrained*		*Received*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability	0.496		0.237		0.267		
Personal characteristics							
% of share capital belonging to majority	0.000	[0.951]	0.001	[0.142]	-0.001	[0.202]	58.395
Foreign ownership present - (d)	0.032	[0.482]	0.069	[0.110]	-0.101**	[0.026]	0.098
Male is responsible for company - (d)	-0.047	[0.319]	0.005	[0.900]	0.041	[0.339]	0.926
Secondary education (d)	0.087	[0.209]	-0.035	[0.541]	-0.052	[0.408]	0.066
Vocational education (d)	0.066	[0.330]	0.004	[0.950]	-0.070	[0.265]	0.087
College educaiton (d)	0.100*	[0.091]	-0.031	[0.514]	-0.068	[0.215]	0.774
Business characteristics							
Average of Log assets in 2000-01	-0.005	[0.591]	-0.032***	[0.000]	0.037***	[0.000]	16.878
Large (d)	-0.010	[0.862]	0.010	[0.851]	0.000	[0.999]	0.255
Medium (d)	-0.002	[0.970]	0.006	[0.909]	-0.004	[0.942]	0.504
Small (d)	-0.060	[0.291]	0.024	[0.644]	0.035	[0.519]	0.154
Age of business is 7 to 10 years (d)	0.018	[0.668]	-0.027	[0.496]	0.008	[0.838]	0.166
Age of business is 11 to 15 years (d)	0.035	[0.411]	-0.086**	[0.031]	0.051	[0.215]	0.169
Age of business is 16 to 25 years (d)	0.002	[0.952]	-0.024	[0.499]	0.022	[0.554]	0.254
Age of business is over 25 years (d)	-0.018	[0.663]	-0.045	[0.224]	0.064	[0.111]	0.230
Company is part of economic group (d)	0.039	[0.210]	-0.044	[0.105]	0.005	[0.859]	0.313
Exports - (d)	-0.074**	[0.015]	0.029	[0.281]	0.045	[0.124]	0.411
Main shareholder is responsible (d)	-0.070**	[0.013]	-0.020	[0.421]	0.091***	[0.001]	0.413
Sold on credit - (d)	-0.036	[0.282]	-0.036	[0.267]	0.072**	[0.032]	0.717
Buying on credit - (d)	-0.106***	[0.005]	0.024	[0.510]	0.082**	[0.023]	0.810
Formal savings - (d)	-0.008	[0.858]	-0.084*	[0.082]	0.092**	[0.035]	0.897
External auditor of financial statements - (d)	0.005	[0.913]	-0.012	[0.749]	0.007	[0.846]	0.800
Registered with government - (d)	0.162***	[0.008]	0.048	[0.405]	-0.210***	[0.001]	0.933
Training of personnel in 2000 or 2001 - (d)	0.030	[0.366]	-0.041	[0.165]	0.011	[0.713]	0.721
Registered with private - (d)	0.003	[0.918]	0.004	[0.888]	-0.008	[0.804]	0.775
Personnel received training in finance - (d)	0.021	[0.579]	-0.030	[0.408]	0.009	[0.825]	0.141
Internet used in 2001 - (d)	-0.047	[0.186]	-0.027	[0.424]	0.073**	[0.023]	0.714
Acquired new technology in 2001 - (d)	-0.010	[0.730]	-0.023	[0.363]	0.033	[0.231]	0.309
Location and activity							
Agro business - (d)	-0.126***	[0.009]	-0.028	[0.504]	0.154***	[0.001]	0.483
Manufacturing - (d)	-0.031	[0.451]	-0.026	[0.492]	0.057	[0.157]	0.267
Percentage employed in agriculture (census	0.002**	[0.034]	-0.002*	[0.058]	0.000	[0.646]	31.502
Population in state (log)	0.004	[0.801]	-0.007	[0.665]	0.002	[0.882]	14.979
Region 1: South & Southeast	-0.127**	[0.010]	0.198***	[0.000]	-0.071	[0.134]	0.153
Region 2: Center	0.050	[0.209]	0.042	[0.242]	-0.092**	[0.020]	0.344
Region 3: Center-west	-0.004	[0.921]	0.031	[0.424]	-0.027	[0.512]	0.216
Region 4: Northwest	0.030	[0.536]	0.059	[0.176]	-0.089*	[0.056]	0.130
Urban area - (d)	0.080*	[0.078]	0.021	[0.591]	-0.101**	[0.027]	0.328
Demand identification							
Problem: reduction in internal resources in 2001 - (d)	-0.031	[0.333]	0.002	[0.741]	0.029	[0.292]	0.251
Problem: selling prices very low - (d)	-0.104***	[0.003]	0.007	[0.674]	0.098***	[0.004]	0.157
No problem to commercialize - (d)	0.062*	[0.052]	-0.004	[0.696]	-0.058**	[0.032]	0.242
Problem: delay in credit payments to clients in 2001 - (d)	-0.003	[0.920]	0.000	[0.925]	0.003	[0.920]	0.178
Finance came from own resources - (d)	0.125***	[0.001]	-0.008	[0.651]	-0.117***	[0.008]	0.864
Plans to make improvements in business - (d)	-0.063**	[0.020]	0.005	[0.633]	0.058**	[0.032]	0.768

Robust p values in brackets.

Number of observations: 1,707.

* significant at 10%; ** significant at 5%; *** significant at 1%

(d): dummy variables.

Note: In the case of dummy variables represents the discrete change from 0 to 1.

Region 5 is the omitted category in this regression.

Table 6f: Enterprises—partial derivatives of participation outcomes in *informal* loan markets (derived from Heckman probit estimates)

	Informal						*Mean value of X*
	No demand		*Credit constrained*		*Received*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability	0.599		0.263		0.137		
Personal characteristics							
% of share capital belonging to majority	0.000	[0.277]	-0.001*	[0.077]	0.000	[0.382]	58.395
Foreign ownership present - (d)	-0.051	[0.257]	-0.012	[0.775]	0.058*	[0.072]	0.098
Male is responsible for company - (d)	-0.030	[0.520]	0.019	[0.658]	0.011	[0.750]	0.926
Secondary education (d)	0.076	[0.260]	-0.042	[0.475]	-0.034	[0.385]	0.066
Vocational education (d)	0.172**	[0.010]	-0.122**	[0.037]	-0.050	[0.231]	0.087
College educaiton (d)	0.122**	[0.033]	-0.048	[0.341]	-0.074**	[0.026]	0.774
Business characteristics							
Average of Log assets in 2000-01	-0.004	[0.624]	0.011	[0.188]	-0.007	[0.276]	16.878
Large (d)	-0.009	[0.876]	-0.056	[0.292]	0.063	[0.125]	0.255
Medium (d)	-0.002	[0.965]	-0.055	[0.248]	0.058	[0.104]	0.504
Small (d)	-0.060	[0.263]	-0.021	[0.682]	0.074*	[0.052]	0.154
Age of business is 7 to 10 years (d)	0.046	[0.282]	-0.080**	[0.026]	0.037	[0.225]	0.166
Age of business is 11 to 15 years (d)	0.019	[0.652]	-0.040	[0.285]	0.021	[0.487]	0.169
Age of business is 16 to 25 years (d)	-0.026	[0.503]	0.000	[0.993]	0.025	[0.372]	0.254
Age of business is over 25 years (d)	-0.059	[0.148]	-0.005	[0.889]	0.060**	[0.037]	0.230
Company is part of economic group (d)	0.012	[0.695]	-0.074**	[0.010]	0.061***	[0.006]	0.313
Exports - (d)	-0.096***	[0.002]	0.039	[0.146]	0.057***	[0.009]	0.411
Main shareholder is responsible (d)	-0.019	[0.504]	0.032	[0.215]	-0.013	[0.502]	0.413
Sold on credit - (d)	-0.001	[0.980]	0.004	[0.906]	-0.003	[0.899]	0.717
Buying on credit - (d)	-0.084**	[0.028]	0.023	[0.459]	0.066**	[0.022]	0.810
Formal savings - (d)	-0.045	[0.307]	-0.009	[0.815]	0.054**	[0.031]	0.897
External auditor of financial statements - (d)	0.109**	[0.010]	-0.027	[0.492]	-0.082***	[0.003]	0.800
Registered with government - (d)	0.135**	[0.027]	-0.063	[0.265]	-0.072	[0.134]	0.933
Training of personnel in 2000 or 2001 - (d)	0.057*	[0.067]	-0.037	[0.203]	-0.020	[0.338]	0.721
Registered with private - (d)	-0.054*	[0.093]	0.011	[0.712]	0.043**	[0.039]	0.775
Personnel received training in finance - (d)	0.047	[0.213]	-0.015	[0.682]	-0.032	[0.250]	0.141
Internet used in 2001 - (d)	-0.044	[0.204]	0.038	[0.238]	0.006	[0.816]	0.714
Acquired new technology in 2001 - (d)	0.011	[0.691]	-0.010	[0.716]	-0.002	[0.924]	0.309
Location and Activity							
Agro business - (d)	-0.015	[0.749]	0.041	[0.335]	-0.026	[0.416]	0.483
Manufacturing - (d)	0.009	[0.818]	0.006	[0.872]	-0.015	[0.597]	0.267
Percentage employed in agriculture (census	0.001	[0.177]	-0.002*	[0.059]	0.000	[0.506]	31.502
Population in state (log)	-0.017	[0.311]	0.005	[0.773]	0.013	[0.278]	14.979
Region 1: South & Southeast	-0.122**	[0.012]	0.041	[0.398]	0.074**	[0.036]	0.153
Region 2: Center	0.051	[0.201]	-0.122***	[0.001]	0.073**	[0.014]	0.344
Region 3: Center-west	0.057	[0.173]	-0.134***	[0.000]	0.082***	[0.008]	0.216
Region 4: Northwest	-0.020	[0.673]	-0.136***	[0.000]	0.144***	[0.000]	0.130
Urban area - (d)	0.077*	[0.076]	-0.059	[0.130]	-0.017	[0.544]	0.328
Demand identification							
Problem: reduction in internal resources in 2001 - (d)	-0.098***	[0.001]	0.079***	[0.001]	0.021	[0.104]	0.251
Problem: selling prices very low - (d)	-0.098***	[0.008]	0.080**	[0.011]	0.021	[0.111]	0.157
No problem to commercialize - (d)	0.029	[0.365]	-0.022	[0.369]	-0.006	[0.388]	0.242
Problem: delay in credit payments to clients in 2001 - (d)	-0.014	[0.678]	0.011	[0.675]	0.003	[0.698]	0.178
Finance came from own resources - (d)	0.081**	[0.027]	-0.066**	[0.034]	-0.017	[0.140]	0.864
Plans to make improvements in business - (d)	-0.043	[0.159]	0.034	[0.185]	0.009	[0.153]	0.768

Robust p values in brackets.
Number of observations: 1,707.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 7a: Incidence of investment incidence and loan market participation categories (percent of column headings)

	All		*No demand*	*Credit constrained*	*Received formal loans*	*Received informal loans only*
	No. Obs.	*%*	*%*	*%*	*%*	*%*
Panel A. Investment in fixed assets (% of column headings)						
Individual entrepreneurs (past 3 years)						
Microentrepreneurs	3300	37.0	30.8	36.7	51.8	56.5
Farmers	1825	27.3	23.4	25.7	37.0	46.2
Enterprises (past 2 years)						
Nonagricultural enterprises	1073	77.6	73.7	72.1	90.6	81.2
Agricultural enterprises	954	79.9	79.8	71.1	88.3	75.2
Panel B. Amounts invested to fixed assets—median values (%)						
Microentrepreneurs	1211	10.2	10.1	8.7	12.8	14.1
Farmers	490	12.6	12.1	11.4	18.7	17.2
Nonagricultural enterprises	776	17.5	17.8	18.8	15.1	22.0
Agricultural enterprises	714	14.9	14.8	12.6	15.2	16.9
Panel C. Investment in agricultural land (% of column headings)						
Purchased agric. land in past 5 years						
All farmers	1825	4.4	3.2	4.8	7.4	6.9
Farmers with owned land	1413	4.8	3.4	5.1	7.1	8.9
Panel D. Amounts invested in land to value of land—median values (%)						
Purchased agric. land in past 5 years						
Farmers with owned land	1413	48.3	50.6	27.2	49.9	81.3

Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 7b: Incidence of investment and I/K ratio across Mexican regions (percent of column headings)

	All regions	*South & Southeast*	*Center*	*Center-west*	*Northwest*	*Northeast*
Panel A. Investment in fixed assets (% of column headings)						
Individual entrepreneurs (past 3 years)						
Microentrepreneurs	37.0	42.4	25.9	44.9	34.2	38.9
Farmers	27.3	45.4	10.5	26.3	30.1	20.9
Enterprises (past 2 years)						
Nonagricultural enterprises	77.6	70.2	78.8	86.4	65.8	78.1
Agricultural enterprises	79.9	75.5	76.1	88.4	75.8	84.3
Panel B. Amounts invested to fixed assets—median values (%)						
Microentrepreneurs	10.2	9.8	11.2	12.2	11.2	7.9
Farmers	12.6	13.3	7.0	14.7	16.0	13.8
Nonagricultural enterprises	17.5	15.7	18.5	18.5	12.7	16.6
Agricultural enterprises	14.9	13.5	12.6	16.7	16.3	18.1
Panel C. Investment in agricultural land (% of column headings)						
Purchased agric. land in past 5 years						
All farmers	4.4	4.7	2.8	6.5	3.5	5.4
Farmers with owned land	4.8	5.1	3.0	7.1	6.4	6.5
Panel D. Amounts invested in land to value of land—median values (%)						
Purchased agric. land in past 5 years						
Farmers with owned land	48.3	63.0	13.8	25.4	62.3	31.0

Source: Authors' calculations based on data from the 2002 Household and Enterprise surveys.

Table 8a: Microentrepreneurs—assets investment, regressions (partial derivatives, probit and tobit estimates)

	Probit - purchase of assets				*Tobit - Value of investment/Value of assets*				*Mean values of Xs*
	Model 1		*Model 2*		*Model 1*		*Model 2*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability (probit)	0.382		0.382491						
Predicted I/K ratio if I/K > 0 (tobit)					0.357		0.357455		
Growth opportunities									
Productive assets (log)	0.022 ***	[0.001]	0.022 ***	[0.001]	-0.006 ***	[0.004]	-0.006 ***	[0.005]	9.5959
No workers hired in 2001 (d)	-0.107 ***	[0.000]	-0.106 ***	[0.000]	-0.038 ***	[0.000]	-0.038 ***	[0.000]	0.6133
Ratio of total productive equipment to owned equipment	-0.034	[0.102]	-0.034	[0.105]	0.005	[0.529]	0.005	[0.511]	1.1542
Age of business (log)	-0.032 ***	[0.003]	-0.031 ***	[0.004]	-0.011 ***	[0.004]	-0.011 ***	[0.004]	1.9749
Expectations									
Present economic situation of the family is better	0.098 ***	[0.000]	0.097 ***	[0.000]	0.023 ***	[0.003]	0.023 ***	[0.003]	0.3052
Plans to make improvements in business	0.050 **	[0.015]	0.049 **	[0.018]	0.015 **	[0.038]	0.015 **	[0.047]	0.4729
Age of entrepreneurs (log)	-0.134 ***	[0.000]	-0.138 ***	[0.000]	-0.053 ***	[0.000]	-0.054 ***	[0.000]	3.7390
Entrepreneurial ability									
Worked as salaried worker (d)	0.042 *	[0.062]	0.043 *	[0.053]	0.018 **	[0.026]	0.018 **	[0.022]	0.6555
Has worked in the United States (d)	0.020	[0.518]	0.021	[0.515]	0.020 *	[0.078]	0.020 *	[0.078]	0.1237
Preliminary steps (d)	0.044 **	[0.034]	0.045 **	[0.032]	0.015 **	[0.040]	0.016 **	[0.036]	0.5180
Owner/worker received training (d)	0.148 ***	[0.000]	0.148 ***	[0.000]	0.044 ***	[0.005]	0.044 ***	[0.005]	0.0680
Availability of funds									
Number of personal items	0.004	[0.110]	0.004	[0.124]	0.002 **	[0.021]	0.002 **	[0.028]	10.2408
Any remittances (d)	0.074 **	[0.020]	0.075 **	[0.019]	0.012	[0.279]	0.013	[0.246]	0.1153
Finance									
Has formal savings (d)	-0.004	[0.898]	-0.016	[0.633]	0.007	[0.570]	0.003	[0.782]	0.1211
Has informal savings (d)	0.072 ***	[0.002]	0.072 ***	[0.002]	0.027 ***	[0.001]	0.027 ***	[0.001]	0.2888
Has received any loans			0.118 ***	[0.000]			0.036 ***	[0.002]	0.1433
Receive formal loans (d)	0.041	[0.376]			0.010	[0.546]			0.0524
Receive informal loans (d)	0.159 ***	[0.000]			0.050 ***	[0.000]			0.0909
Credit constrained (d)	0.030	[0.171]	0.030	[0.172]	0.010	[0.214]	0.010	[0.216]	0.3710
Locality characteristics									
Population employed in agricultural sector in	0.003 ***	[0.000]	0.003 ***	[0.000]	0.001 **	[0.012]	0.001 **	[0.010]	23.5021
Population in municipality (log)	0.011	[0.274]	0.010	[0.301]	0.007 **	[0.043]	0.007 *	[0.051]	10.5641
Region 1: South & Southeast (d)	0.066 *	[0.082]	0.069 *	[0.069]	0.019	[0.189]	0.020	[0.168]	0.2957
Region 2: Center (d)	-0.117 ***	[0.001]	-0.112 ***	[0.002]	-0.022 *	[0.095]	-0.021	[0.121]	0.2892
Region 3: Center-west (d)	0.006	[0.880]	0.005	[0.898]	0.006	[0.685]	0.005	[0.705]	0.1961
Region 4: Northwest (d)	-0.076 *	[0.070]	-0.072 *	[0.086]	-0.018	[0.237]	-0.016	[0.282]	0.1182
Economic sector									
Trade (d)	-0.181 ***	[0.000]	-0.179 ***	[0.000]	-0.043 ***	[0.000]	-0.042 ***	[0.000]	0.3590
Services (d)	0.025	[0.428]	0.028	[0.372]	0.005	[0.632]	0.007	[0.549]	0.1670
Construction (d)	0.149 ***	[0.000]	0.151 ***	[0.000]	0.019	[0.135]	0.020	[0.116]	0.1291
Transportation and communication (d)	-0.053	[0.237]	-0.053	[0.231]	0.033 *	[0.060]	0.032 *	[0.062]	0.0618
Observations	2749		2749		2744		2744		
Wald chi2 (probits), LR chi2 (tobits)	429.71		426.27		320.60		316.57		
Prob > chi2	0.0000		0.0000		0.0000		0.0000		
Pseudo R2	0.133		0.1321		0.088		0.0865		
SE					0.542		0.542445		

Robust p values in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables the partial derivatives represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 8b: Farmers—assets and land investment
(partial derivatives, probit estimates)

	Probits							
	Purchase of assets				*Purchase of land*			
	Model 1		*Model 2*		*Model 1*		*Model 2*	
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*
Predicted probability (probit)	0.221776		0.221853		0.03213		0.032322	
Predicted I/K ratio if I/K > 0 (tobit)								
Growth opportunities								
Value of owned land (log)					0.005 *	[0.069]	0.005 *	[0.067]
Value of productive assets	0.013 **	[0.040]	0.013 **	[0.040]				
No workers hired in 2001(d)	0.051 *	[0.055]	0.051 *	[0.055]	-0.018 *	[0.083]	-0.017 *	[0.094]
Ratio of areas: used to owned land	0.021	[0.344]	0.021	[0.339]	0.010	[0.121]	0.010	[0.130]
Age of business (log)	0.045 **	[0.030]	0.045 **	[0.030]	-0.012 *	[0.079]	-0.012 *	[0.083]
Irrigation (d)	-0.010	[0.742]	-0.009	[0.752]	0.016	[0.176]	0.016	[0.194]
Expectations								
Present economic situation of the family is better	0.097 ***	[0.001]	0.098 ***	[0.001]	0.023 *	[0.077]	0.023 *	[0.083]
Plans to make improvements in business	0.021	[0.472]	0.021	[0.468]	0.020 *	[0.068]	0.020 *	[0.062]
Age of entrepreneur (log)	-0.146 ***	[0.006]	-0.145 ***	[0.007]	0.008	[0.674]	0.006	[0.752]
Entrepreneurial ability								
Worked as salaried worker (d)	0.050 *	[0.059]	0.049 *	[0.060]	0.015	[0.163]	0.016	[0.150]
Has worked in the United States	0.045	[0.275]	0.044	[0.279]	0.005	[0.714]	0.005	[0.743]
Preliminary steps (d)	-0.018	[0.513]	-0.018	[0.512]	0.000	[0.997]	0.000	[0.997]
Received training (d)	0.043	[0.263]	0.044	[0.254]	-0.003	[0.848]	-0.004	[0.767]
inherited the farm (d)	-0.042	[0.132]	-0.042	[0.133]	-0.004	[0.710]	-0.004	[0.695]
Availability of funds								
Received PROCAMPO transfers (d)	0.051 *	[0.050]	0.051 **	[0.048]	0.004	[0.730]	0.003	[0.780]
Received remittances (d)	0.000	[0.998]	0.000	[0.996]	0.004	[0.810]	0.004	[0.812]
Finance								
Has formal savings (d)	0.175 ***	[0.002]	0.177 ***	[0.002]	0.109 ***	[0.000]	0.105 ***	[0.000]
Has informal savings (d)	0.068	[0.101]	0.067	[0.103]	0.033 **	[0.042]	0.034 **	[0.038]
Has received any loans (d)			0.075 *	[0.065]			0.007	[0.621]
Receive formal loans (d)	0.088	[0.155]			-0.007	[0.697]		
Receive informal loans (d)	0.067	[0.151]			0.018	[0.316]		
Credit constrained (d)	0.000	[0.993]	0.000	[0.993]	0.010	[0.371]	0.010	[0.379]
Locality characteristics								
Population employed in agricultural sector in	0.002 ***	[0.009]	0.002 ***	[0.009]	0.001 **	[0.044]	0.001 **	[0.037]
Population in municipality (log)	-0.009	[0.460]	-0.010	[0.456]	0.000	[0.967]	0.000	[0.988]
Region 1: South & Southeast (d)	0.360 ***	[0.000]	0.359 ***	[0.000]	0.007	[0.759]	0.007	[0.747]
Region 2: Center (d)	-0.005	[0.934]	-0.006	[0.924]	-0.004	[0.841]	-0.004	[0.845]
Region 3: Center-west (d)	0.100	[0.122]	0.099	[0.124]	-0.009	[0.656]	-0.009	[0.654]
Region 4: Northwest (d)	0.076	[0.428]	0.076	[0.422]	-0.022	[0.290]	-0.023	[0.260]
Economic sector								
activity==Livestock-Agro	-0.046	[0.445]	-0.046	[0.446]	-0.006	[0.778]	-0.006	[0.783]
activity==Forestry-Agro	-0.041	[0.601]	-0.041	[0.598]	0.060	[0.112]	0.062	[0.103]
Observations	1311		1311		1112		1112	
Wald chi2 (probits), LR chi2 (tobits)	247.93		248.05		99.99		97	
Prob > chi2	0.0000		0.0000		0.0000		0.0000	
Pseudo R2	0.1811		0.181		0.1734		0.1714	

Robust p values in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables the partial derivatives represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 8c: Farmers—assets and land investment
(partial derivatives, tobit estimates)

	Value of investment/value of assets								*Mean values of Xs*
	Value of investment/value of assets				*Value of land purchases/land value*				
	Model 1		*Model 2*		*Model 1*		*Model 2*		
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	
Predicted probability (probit)									
Predicted I/K ratio if I/K > 0 (tobit)	0.293549		0.293755		0.657133		0.658441		
Growth opportunities									
Value of owned land (log)					0.006	[0.375]	0.007	[0.371]	10.4116
Value of productive assets	-0.003	[0.209]	-0.003	[0.219]					9.183
No workers hired in 2001(d)	0.010	[0.316]	0.010	[0.303]	-0.054	[0.107]	-0.053	[0.116]	0.3135
Ratio of areas: used to owned land	0.015 *	[0.073]	0.015 *	[0.078]	0.021	[0.340]	0.020	[0.365]	1.0927
Age of business (log)	0.015 *	[0.057]	0.015 *	[0.055]	-0.034 *	[0.085]	-0.034 *	[0.088]	3.0743
Irrigation (d)	0.003	[0.754]	0.003	[0.777]	0.032	[0.332]	0.030	[0.359]	0.2715
Expectations									
Present economic situation of the family is better	0.033 ***	[0.006]	0.032 ***	[0.007]	0.065 *	[0.053]	0.065 *	[0.058]	0.2105
Plans to make improvements in business	0.010	[0.311]	0.010	[0.313]	0.042	[0.196]	0.044	[0.177]	0.3272
Age of entrepreneur (log)	-0.048 **	[0.015]	-0.049 **	[0.012]	0.007	[0.901]	0.002	[0.966]	3.977
Entrepreneurial ability									
Worked as salaried worker (d)	0.022 **	[0.022]	0.023 **	[0.021]	0.034	[0.284]	0.035	[0.271]	0.5599
Has worked in the United States	0.019	[0.230]	0.019	[0.226]	0.009	[0.842]	0.008	[0.858]	0.1342
Preliminary steps (d)	0.006	[0.540]	0.006	[0.530]	-0.006	[0.838]	-0.006	[0.847]	0.3356
Received training (d)	0.014	[0.331]	0.013	[0.352]	0.007	[0.848]	0.004	[0.917]	0.1442
inherited the farm (d)	-0.004	[0.681]	-0.004	[0.681]	-0.013	[0.669]	-0.013	[0.664]	0.656
Availability of funds									
Received PROCAMPO transfers (d)	0.006	[0.502]	0.006	[0.527]	-0.002	[0.948]	-0.004	[0.904]	0.4272
Received remittances (d)	-0.003	[0.796]	-0.003	[0.802]	0.017	[0.674]	0.017	[0.675]	0.1449
Finance									
Has formal savings (d)	0.066 ***	[0.003]	0.065 ***	[0.003]	0.158 ***	[0.007]	0.153 ***	[0.009]	0.0763
Has informal savings (d)	0.014	[0.356]	0.014	[0.343]	0.079 *	[0.052]	0.081 **	[0.048]	0.1083
Has received any loans (d)			0.024	[0.107]			0.015	[0.725]	0.1381
Receive formal loans (d)	0.016	[0.464]			-0.017	[0.765]			0.0557
Receive informal loans (d)	0.030	[0.103]			0.037	[0.482]			0.0824
Credit constrained (d)	-0.001	[0.935]	-0.001	[0.933]	0.016	[0.635]	0.016	[0.641]	0.4272
Locality characteristics									
Population employed in agricultural sector in	0.001 ***	[0.004]	0.001 ***	[0.003]	0.001	[0.105]	0.001 *	[0.092]	32.4921
Population in municipality (log)	0.000	[0.998]	0.000	[0.992]	0.001	[0.970]	0.001	[0.960]	10.2803
Region 1: South & Southeast (d)	0.080 ***	[0.002]	0.081 ***	[0.002]	0.010	[0.875]	0.010	[0.876]	0.3326
Region 2: Center (d)	-0.029	[0.194]	-0.028	[0.201]	-0.023	[0.728]	-0.023	[0.725]	0.4043
Region 3: Center-west (d)	0.013	[0.569]	0.014	[0.563]	-0.034	[0.571]	-0.035	[0.561]	0.1693
Region 4: Northwest (d)	0.002	[0.959]	0.001	[0.975]	-0.045	[0.572]	-0.050	[0.524]	0.0328
Economic sector									
activity==Livestock-Agro	-0.017	[0.422]	-0.017	[0.418]	-0.004	[0.944]	-0.004	[0.952]	0.0458
activity==Forestry-Agro	0.005	[0.867]	0.005	[0.863]	0.111	[0.198]	0.113	[0.192]	0.0236
Observations	1225		1225		1111		1111		
Wald chi2 (probits), LR chi2 (tobits)	211.89		211.58		62.12		61.5		
Prob > chi2	0.0000		0.0000		0.0002		0.0002		
Pseudo R2	0.1555		0.1553		0.1135		0.1124		

Robust p values in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables the partial derivatives represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 9a. Enterprises—assets investment
(partial derivatives, probit estimates)

Variable	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
	Coefficient [1]	*p-value*	*Coefficient* [1]	*p-value*	*Coefficient* [1]	*p-value*	*Coefficient* [1]	*p-value*	*Coefficient* [1]	*p-value*
Predicted probability (probit)	0.847		0.847		0.847		0.847		0.849	
Enterprise characteristics										
Value investment/value assets (2000)	0.382***	[0.000]	0.383***	[0.000]	0.384***	[0.000]	0.384***	[0.000]	0.408***	[0.000]
Sales growth (2001-2000)	0.133***	[0.000]	0.134***	[0.000]	0.134***	[0.000]	0.135***	[0.000]	0.134***	[0.000]
Total productive assets (log)	0.052***	[0.000]	0.052***	[0.000]	0.052***	[0.000]	0.052***	[0.000]	0.054***	[0.000]
Cash flow/total assets (2000)									-0.021	[0.515]
Manufacturing (d)	0.011	[0.692]	0.011	[0.683]	0.011	[0.670]	0.012	[0.643]	0.007	[0.791]
Agriculture (d)	0.005	[0.834]	0.006	[0.815]	-0.004	[0.879]	-0.004	[0.885]	-0.012	[0.638]
Finance indicators										
Receive any loan (d)			0.059***	[0.005]			0.046	[0.125]		
Receive formal loans (d)	0.064***	[0.006]			0.055	[0.115]				
Receive informal loans (d)	0.041	[0.184]			0.026	[0.562]				
Credit constrained (d)	0.042	[0.194]	0.042	[0.190]	0.038	[0.247]	0.038	[0.247]	0.018	[0.586]
Agriculture (d) * Receive any loan (d)							0.026	[0.542]		
Agriculture (d) * Receive formal loans					0.020	[0.693]				
Agriculture (d) * Receive informal loans					0.034	[0.586]				
Agriculture (d)* Credit constrained (d)	-0.030	[0.530]	-0.031	[0.525]	-0.019	[0.697]	-0.019	[0.701]	-0.027	[0.569]
Agriculture (d) * Cash flow									0.076*	[0.071]
Regional characteristics										
Region 1: South & Southeast (d)	-0.033	[0.316]	-0.035	[0.297]	-0.034	[0.309]	-0.035	[0.298]	-0.037	[0.275]
Region 2: Center (d)	-0.051*	[0.085]	-0.052*	[0.079]	-0.051*	[0.084]	-0.052*	[0.077]	-0.052*	[0.081]
Region 3: Center-west (d)	0.068**	[0.029]	0.067**	[0.032]	0.067**	[0.032]	0.066**	[0.036]	0.064**	[0.042]
Region 4: Northwest (d)	0.004	[0.916]	0.001	[0.977]	0.002	[0.964]	0.000	[0.994]	0.006	[0.868]
Observations	1625		1625		1625		1625		1606	
Wald chi2 (probits), LR chi2 (tobits)	202.470		201.820		203.580		201.620		200.920	
Prob > chi2	0.000		0.000		0.000		0.000		0.000	
r2:	0.213		0.212		0.213		0.213		0.213	

Robust p values in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables the partial derivatives represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 9b. Enterprises—assets investment
(partial derivatives, tobit estimates)

	Model (1)		*Model (2)*		*Model (3)*		*Model (4)*		*Model (5)*		*Mean values of Xs*
	Coefficient [1]	*p-value*	*Coefficient* [1]	*p-value*	*Coefficient* [1]	*p-value*	*Coefficient* [1]	*p-value*	*Coefficient* [1]	*p-value*	
Predicted I/K ratio if I/K > 0 (tobit)	0.282		0.282		0.282		0.282		0.279		
Enterprise characteristics											
Value investment / Value assets (2000)	0.245***	[0.000]	0.245***	[0.000]	0.245***	[0.000]	0.245***	[0.000]	0.244***	[0.000]	0.202
Sales-growth (2001-2000)	0.091***	[0.000]	0.091***	[0.000]	0.092***	[0.000]	0.091***	[0.000]	0.088***	[0.000]	-0.025
Total productive assets (log)	0.004**	[0.013]	0.004**	[0.014]	0.004***	[0.009]	0.004**	[0.010]	0.005***	[0.003]	16.802
Cash flow/total assets (2000)									-0.004	[0.771]	0.000
Manufacturing (d)	-0.029***	[0.002]	-0.029***	[0.002]	-0.028***	[0.004]	-0.028***	[0.005]	-0.030***	[0.002]	0.256
Agriculture (d)	-0.017*	[0.075]	-0.017*	[0.071]	-0.029**	[0.014]	-0.029**	[0.014]	-0.027***	[0.008]	0.483
Finance indicators											
Receive any loan (d)			0.025***	[0.003]			0.011	[0.321]			0.368
Receive formal loans (d)	0.023**	[0.010]			0.012	[0.361]					0.268
Receive informal loans (d)	0.029**	[0.031]			0.010	[0.570]					0.100
Credit constrained (d)	0.029**	[0.046]	0.029**	[0.047]	0.023	[0.113]	0.023	[0.115]	0.018	[0.196]	0.182
Agriculture (d)* Credit constrained (d)	-0.025	[0.143]	-0.025	[0.145]	-0.013	[0.494]	-0.013	[0.493]	-0.027	[0.106]	0.094
Agriculture (d) * Receive any loan (d)							0.028	[0.103]			0.198
Agriculture (d) * Receive formal loans					0.023	[0.208]					0.150
Agriculture (d) * Receive informal loans					0.043	[0.132]					0.048
Agriculture (d) * Cash flow									0.038**	[0.026]	0.108
Regional characteristics											
Region 1: South & Southeast (d)	-0.011	[0.380]	-0.010	[0.396]	-0.011	[0.377]	-0.010	[0.409]	-0.010	[0.404]	0.160
Region 2: Center (d)	-0.005	[0.667]	-0.004	[0.685]	-0.005	[0.630]	-0.005	[0.645]	-0.004	[0.718]	0.329
Region 3: Center-west (d)	0.023*	[0.057]	0.023*	[0.056]	0.022*	[0.070]	0.022*	[0.067]	0.023*	[0.055]	0.218
Region 4: Northwest (d)	0.008	[0.554]	0.009	[0.521]	0.006	[0.663]	0.007	[0.582]	0.009	[0.483]	0.132

Robust p values in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%
(d): dummy variables.
Note: In the case of dummy variables the partial derivatives represents the discrete change from 0 to 1.
Region 5 is the omitted category in this regression.

Table 10: Estimated effect on investment behavior of removing credit constraints (percent)

	Predicted values				*Percentage increased relative to being credit constrained*		
	Credit constrained	*Received formal loans*	*Received informal loans*	*Received any loan*	*Received formal loans*	*Received informal loans*	*Received any loan*
	(1)	*(2)*	*(3)*	*(4)*	*(2)/(1) -1*	*(3)/(1) -1*	*(4)/(1) -1*
Microentrepreneurs							
Purchase assets	38.5	42.6	54.5	50.4	10.7	41.6	30.9
I/K: assets	35.9	36.9	41.0	39.5	2.8	14.3	10.2
Farmers							
Purchase assets	21.2	29.9	27.9	28.7	40.9	31.5	35.2
Purchase land	3.7	3.0	5.8	4.5	-20.2	56.2	21.8
I/K: assets	29.0	30.5	31.9	31.4	5.3	10.1	8.3
Nonagricultural enterprises							
Purcharse assets							
Model 1	86.1	91.6	89.9	n.a.	6.4	4.4	n.a.
Model 2	86.3	n.a.	n.a.	90.3	n.a.	n.a.	4.6
Model 3	86.1	90.9	88.5	n.a.	5.6	2.8	n.a.
Model 4	86.1	n.a.	n.a.	90.1	n.a.	n.a.	4.6
I/K ratio							
Model 1	30.8	33.4	34.0	n.a.	8.5	10.6	n.a.
Model 2	30.8	n.a.	n.a.	33.6	n.a.	n.a.	9.1
Model 3	30.7	32.0	31.8	n.a.	4.2	3.5	n.a.
Model 4	30.7	n.a.	n.a.	32.0	n.a.	n.a.	4.1
Agricultural enterprises							
Purcharse assets							
Model 1	83.7	89.9	88.0	n.a.	7.4	5.1	n.a.
Model 2	82.3	n.a.	n.a.	87.0	n.a.	n.a.	5.8
Model 3	83.8	91.1	90.0	n.a.	8.8	7.4	n.a.
Model 4	83.8	n.a.	n.a.	90.9	n.a.	n.a.	8.5
I/K ratio							
Model 1	26.5	28.7	29.2	n.a.	8.4	10.4	n.a.
Model 2	26.5	n.a.	n.a.	28.8	n.a.	n.a.	8.9
Model 3	26.5	29.8	31.5	n.a.	12.4	18.8	n.a.
Model 4	26.5	n.a.	n.a.	30.2	n.a.	n.a.	13.9

n.a.: not applicable.

Source: Authors' calculations using regression coefficients in Tables 8a, 8b, 8c, 9a, and 9b.